Regulation, Leverage, and Derivative Use

by Mutual Funds

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Preface

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An Introductory Summary

The present cumulative doctoral thesis focuses on regulation of leverage and derivative use by mutual funds in the U.S. and Germany. It comprises analyses of investments and disclosures of credit default swaps (CDS) of the largest U.S. and German funds, as well as analyses of the determinants of U.S. funds' decisions to use credit derivatives. The thesis consists of three parts. Each part represents a single, self-contained paper.

Part 1: Dominika Paula Gałkiewicz (2014): "Similarities and Differences between U.S. and German Regulation of the Use of Derivatives and Leverage by Mutual Funds – What Can Regulators Learn from Each Other?", working paper.

Part 2: Dominika Paula Gałkiewicz (2014): "Loss Potential and Disclosures Related to Credit Derivatives – A Cross-Country Comparison of Corporate Bond Funds under U.S. and German Regulation", working paper.

Part 3: Dominika Paula Gałkiewicz (2014): "Manager Characteristics and Credit Derivative Use by U.S. Corporate Bond Funds", working paper.

The popularity of credit derivative markets grew tremendously after the turn of the century (BIS Quartely Review (2008, 2013)) and led to severe losses among financial institutions and mutual funds during the financial crisis 2007-2009 (e.g. Brice (2011) and Adam and Guettler (2014)). At the same time, the experiences from the financial crisis 2007-2009 with AIG, Bear Stearns and the Oppenheimer Champion Income Fund revealed that investors and regulators were not fully aware of the risks arising from investments in credit derivative securities for these market participants. In addition, the crisis demonstrated that the extent of derivative use by funds were unknown to the public and regulators due to lack of data (e.g. Dodd-Frank Act (2010), and SEC Concept Release on Derivatives (2011)). Given that in 2012 the size of the mutual fund industry in the U.S. and Europe surpassed 12 trillion U.S. dollar and 8 trillion Euro in assets (ICI Fact Book (2013) and BVI Jahresbericht (2013)), respectively, this is critical.

In view of the aforementioned developments, the first study analyzes the regulation at the time surrounding the 2007-2009 financial crisis and after with respect to leverage and derivative holdings for mutual funds in the U.S. and Germany. After presenting a detailed overview of U.S. and German regulations, this study thoroughly compares the levels of flexibility funds have in both countries. I find that funds in the U.S. and Germany face limits on direct leverage (amount of bank borrowing) of up to 33% and 10% of their total net assets (TNA), respectively. Funds can extend these limits indirectly by

using derivatives beyond their net assets (e.g., by selling CDS protection with a notional amount equal to their net assets). Additionally, issuer-oriented rules in the U.S. and Germany account for issuer risk differently: U.S. funds have greater discretion to undervalue derivative exposure compared to German funds. All analyses of this study reveal that under existing derivative and leverage regulation, funds in both countries are able to increase risk by using derivatives up to the point at which it is possible for them to default solely due to investments in derivatives. This makes the issue of regulation highly relevant for the public and regulators.

The second study builds upon the first and empirically investigates the level of credit derivatives use by funds together with their communication toward investors. Firstly, the loss potential arising from investments into CDS for a sample of large U.S. and German mutual funds is analyzed. Secondly, it is investigated whether comments on CDS use contained in periodic fund reports are consistent with the disclosed CDS holdings. For several funds in the U.S., the potential losses arising from selling CDS protection (as measured by the sum of notional amounts following U.S. law) are almost as high as a fund's TNA. In Germany, this potential can be even higher. Regarding the information funds provide to investors about their use of CDS, the results of the study suggest that comments on CDS contained in periodic reports are often unspecific and sometimes misleading. Thus, investors might have to analyze portfolio holdings in order to learn about the true investment behavior of funds. For instance, in Germany, funds selling more CDS protection than they buy often state that they only buy CDS protection for hedging purposes. Based on these results, it seems advisable that regulators in both countries tighten rules restricting the speculative use of derivatives by funds to a reasonable level, as well as implement more standardized disclosure policies.

The third study sheds light on another aspect of credit derivative use by mutual funds. It analyzes what determines whether U.S. corporate bond funds decide to use CDS in a particular period between mid-2004 to 2010, to which extent they use them and how, by relying on various fund characteristics including an extended set of manager variables. In addition, the types of various credit derivatives that funds use (e.g. long and short CDS on single-name or multi-name underlying positions) are presented. Results suggest that a manager's education, age, experience, and skill are positively correlated with a fund's CDS holdings. In particular, funds with successful, older, and more experienced managers are more likely to take on credit risk via selling CDS protection as opposed to funds with younger managers or managers that were educated at prestigious universities and have differing concerns about their careers. Overall, funds most often use multi-name CDS written on CDS indices and bond indices, which are not ABS, while the majority of single-name CDS used reference issuers from the industries of Financials, Others, and the sovereign governments category. The above

results suggest that the characteristics of fund managers affect a fund's risk taking via derivatives, in addition to fund fundamentals.

These findings are important for the public and regulators since, in the interest of investor protection, unsuccessful fund investments into derivatives could be limited via stricter regulation or internal restrictions.

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Part 3

List of Abbrevations

ABS	Asset-Backed Securities
AIF	Alternative Investment Fund
AIFMD	Alternative Investment Fund Managers Directive
AIG	American Insurance Group
AIG	Auslandinvestmentgesetz
BaFin	Bundesanstalt für Finanzdienstleistungsaufsicht
BCBS	Basel Committee on Banking Supervision
BGBl	Bundesgesetzblatt
BIS	Bank for International Settlements
BVI	Bundesverband Investment und Asset Management e. V.
CCP	Central Counterparty
CDS	Credit Default Swaps
CDX	Credit Default Swap Index
CESR	Committee of European Securities Regulators
CFA	Chartered Financial Analyst
CFRS	Committee of Federal Regulation of Securities
CFTC	Commodity Futures Trading Commission
CIL	Capital Investment Law
CRSP	Center for Research in Security Prices
DerivateV	Derivateverordnung
EMIR	European Market Infrastructure Regulation
FASB	Financial Accounting Standards Board
FIFA	Foreign Investment Funds Act
FR	Federal Register
FX	Foreign Exchange
GCICA	German Capital Investment Companies Act
GCotICI	General Counsel of the Investment Company Institute
I.d.F.	in der Fassung
IA	Investment Act

IA	Implementation-Act
IAA	Investment Amendment Act
ICA	Investment Company Act
InvÄndG	Investmentänderungsgesetz
InvG	Investmentgesetz
InvStG	Investmentsteuergesetz
IOSCO	International Organization of Securities Commissions
ITA	Investment Tax Act
KAGB	Kapitalanlagegesetzbuch
KAGG	Gesetz für Kapitalanlagegesellschaften
KIID	Key Investor Information Document
OGAW	Organismen für gemeinsame Anlagen in Wertpapieren
OTC	Over-the-counter
PPP	Public-Private Partnership
SAI	Statement of Additional Information
SEC	Securities and Exchange Commission
SEF	Swap Execution Facility
TNA	Total Net Asset Value
UCITS	Undertakings in Collective Investment in Transferable Securities
UmsG	Umsetzungsgesetz
VaR	Value-at-Risk

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Part 1

Similarities and Differences between U.S. and German Regulation of the Use of Derivatives and Leverage by Mutual Funds – What Can Regulators Learn from Each Other?

Similarities and Differences between U.S. and German Regulation of the Use of Derivatives and Leverage by Mutual Funds – What Can Regulators Learn from Each Other?

by Dominika Paula Gałkiewicz

Abstract

This study analyzes current regulation with respect to the use of derivatives and leverage by mutual funds in the U.S. and Germany. After presenting a detailed overview of U.S. and German regulations, this study thoroughly compares the level of flexibility funds have in both countries. I find that funds in the U.S. and Germany face limits on direct leverage (amount of bank borrowing) of up to 33% and 10% of their net assets, respectively. Funds can extend these limits indirectly by using derivatives beyond their net assets (e.g., by selling credit default swaps protection with a notional amount equal to their net assets). Additionally, issuer-oriented rules in the U.S. and Germany account for issuer risk differently: U.S. funds have greater discretion to undervalue derivative exposure compared to German funds. All analyses of this study reveal that under existing derivative and leverage regulation, funds in both countries are able to increase risk by using derivatives up to the point at which it is possible for them to default solely due to investments in derivatives. The results of this study are highly relevant for the public and regulators.

JEL-Classification: G15, G18

Key Words: Regulation, mutual funds, leverage, derivative, credit default swaps

"Unfortunately, these risks were not made known to investors and stockbrokers failed to do even the most basic due diligence on the fund to learn of its high risk nature."[1]

1 Introduction

How much flexibility does U.S. and German/EU regulation offer regarding the use of derivatives and leverage by publicly available funds? In recent years, highly regulated market participants, including mutual funds, were heavily exposed to risk via derivative use; unfortunately, regulators failed to intervene before trouble ensued. Financial institutions, such as the American Insurance Group (AIG), Bear Stearns, and the Oppenheimer Champion Income Fund, were in headlines around the world because of their near collapse due to investments in credit default swaps (CDS).[2] These funds were not the exception: The majority of U.S. corporate bond funds increased their CDS positions and faced higher risks during the 2007-2009 financial crisis (Adam and Guettler (2014)).[3] As indicated by these recent events, the use of CDS might have a tremendous impact on the performance and risk of mutual funds, which is why it is important for the public to understand the flexibility offered by current mutual fund regulation.[4]

This study analyzes the U.S. and Germany/EU regulation of the use of derivatives and leverage by mutual funds by presenting the relevant rules and highlighting the main similarities and differences between both countries, especially regarding the level of flexibility. In particular, this study discusses the application of existing regulation for CDS, which came into the limelight during the financial crisis of 2007-2009 (e.g., Stulz (2010), and Brice (2011)), and its (un)intended consequences.[5] In addition, mutual funds in the EU follow the EU-wide regulation of the Undertakings in Collective Investment in Transferable Securities (UCITS) Directive 85/611/EEC, which, starting in 2001, broadened the flexibility of funds with regard to derivatives. Germany implemented this regulation in 2004 and is considered representative of the broader EU-wide regulation in this study; however, it is important to note that the implementation date and/or details of regulation in other EU-countries may differ.

[1] "Recovering Oppenheimer Champion Fund Losses" [http://www.oppenheimerfundfraud.com/id3.html, visited on 08.09.2012].

[2] See "Recovering Oppenheimer Champion Fund Losses" [http://www.oppenheimerfundfraud.com/id3.html, visited on 08.09.2012], and Brice (2011). AIG had to be rescued by the U.S. government because a large amount of future obligations from sold CDS contracts on mortgage backed securities fell suddenly and surpassed the size of its assets (Brice (2011)).

[3] Furthermore, Van Ofwegen, Verschoor, and Zwinkels (2012) find a relationship between credit derivative use and the insolvency risk of the 20 biggest European financial institutions.

[4] Publications of the Securities and Exchange Commission (SEC), e.g., SEC Staff report (1994), SEC Letter to the GCotICI (2010), and the SEC Concept Release on Derivatives (2011), suggest the importance of the derivative strategies of mutual funds after times of crisis.

[5] Managers of poorly and well-performing funds often face strong incentives to increase the riskiness of their funds as their salary and employment status depend on the development of the fund's assets (e.g., Brown, Harlow, and Starks (1996)). It is well documented that managers succeeding in fund tournaments and fund family tournaments attract more inflows from investors and support from the fund family (e.g., Chevalier and Ellison (1997), Taylor (2003), Kempf and Ruenzi (2008), and Kempf, Ruenzi and Thiele (2009)).

Funds might use derivatives for various reasons, e.g., to hedge interest rates, currency, or market risks; to substitute for a direct investment in the underlying position; or to increase returns. Regulators mainly limit a fund's exposure to loss from its various operations. Concerning derivatives, excessive leverage, illiquidity (particularly with regard to complex, over-the-counter (OTC) derivatives), and large counterparty risk are of high importance to regulators.[6] In this study, I present how the U.S. and German/EU regulatory frameworks measure and protect against the possible negative effects of leverage and derivatives. In order to determine the amount of flexibility regulation allows funds to have when designing their leverage and derivative strategies, I analyze two types of restrictions: those of general nature and those that are more issuer oriented. In the U.S. and Germany, the only direct form of leverage available to funds is bank borrowing. However, funds can implicitly create an effect similar to explicit borrowing (direct leverage) by investing in derivatives or engaging in securities-lending transactions[7] (indirect leverage). For example, a fund can create implicit leverage the size of the notional amount[8] by selling protection via CDS (short position), which is comparable to borrowing the notional amount from a bank and investing it in the principal of a bond. Funds that build high positions in derivatives can create extensive leverage, which could lead to liquidity problems and ultimately default.

The U.S. and German/EU regulatory frameworks differ in how they regulate the use of derivatives and leverage by funds. In the U.S., the amount a fund borrows from the bank is restricted to up to 33% of their net assets, while in Germany funds can only borrow up to 10% of their net assets. In addition to limits on direct leverage, U.S. and German regulation limits derivative use. In the U.S., funds, in general, are required to segregate or earmark portfolio securities as collateral for all potential obligations to a third party created by securities-lending transactions and derivatives, such as futures, forwards, written options, short CDS. Theoretically, under U.S. regulation, a fund could sell protection via CDS with a notional amount equal to its net asset value and earmark all its portfolio securities as collateral.[9] In Germany/the EU, funds, in general, can use derivatives to at most double the potential market risk of a fund (as measured by the Value-at-Risk (VaR) determined at the 99% confidence level). Similarly, a fund might sell CDS protection with a notional amount equal to (or even higher than) its net assets as long as its VaR is less than twice as high as a VaR of a comparable fund without derivatives. Thus, by using derivatives, such as short CDS, a fund might create additional leverage and thereby circumvent the more stringent restrictions on direct leverage. However, if funds in worst case

[6] See the SEC Concept Release on Derivatives (2011), p. 5, and the ICI Report on Derivatives (2008), p. 8-12.
[7] E.g., if a fund enters into a repurchase agreement, it hands over some of its securities to the counterparty and receives cash instead, which is comparable to a collateralized loan.
[8] In case of derivatives, the notional amount usually reflects the scale of a position with reference to some underlying asset, and shows the volume traded during a period of time (McDonald (2009)).
[9] However, funds often segregate smaller amounts than originally required (only the daily mark to market liability) in the case of futures, forwards and interest rate swaps that require cash-settlement (SEC Concept Release on Derivatives (2011)).

are required to pay the notional amount to the counterparty once a credit event specified under the CDS contract occurs, they might become illiquid due to extensive leverage. As a consequence of the flexibility provided by regulation, it is possible for funds in both countries to lose a large part of their value due to investments in derivatives, such as CDS, alone. This is exactly what happened to the Oppenheimer Champion Income Fund, which lost almost 80% of its value in 2008 primarily due to its CDS positions. This undesirable outcome suggests that it may be necessary to revise the regulation of derivatives in order to better protect mutual fund investors from potentially significant losses.

Other rules, i.e., issuer-oriented rules, guarantee a fund's independence from the credit risk of a few particular issuers by requiring it to diversify its portfolio. These rules limit a fund's exposure to losses from the default of the issuers of securities, including derivative reference issuers (issuer risk) and counterparties (counterparty risk). In the U.S. and Germany, issuer-oriented rules limit the investment of mutual funds into the securities of one particular issuer by a certain amount of a fund's net assets, e.g., up to 5%. However, the way the two countries account for exposure to the reference issuers of derivatives is different. Compared to Germany, U.S. funds are able to underestimate the exposure to particular issuers to a larger extent due to the application of the mark to market valuation.[10] This difference is especially pronounced for the reference-issuer exposure gained from selling CDS protection to synthesize bonds, which is considered at the market (fair) value of the CDS in the U.S. (by contrast, it is considered at the market value of underlying position of the CDS (or notional amount) in Germany/the EU, which is in line with bond valuation under issuer-oriented rules). Thus, by selling protection via CDS written on high-risk positions, funds can influence their asset allocations and risk profiles to a large extent under U.S. regulation. In order to guarantee a fund's independence from a few individual issuers and enhance investor protection, it is advisable that U.S. regulation accounts for the exposure to issuers more adequately than currently prescribed. Additional issuer-oriented rules guarantee that exposure to counterparty risk from derivative contracts (approximately measured by the positive market values of derivatives in both countries) does not exceed 5% of a fund's assets in the absence of exchange trading or central clearing. Furthermore, new global rules on mandatory central clearing for the majority of derivative transactions will further decrease potential counterparty risk.[11]

[10] According to the mark to market valuation, exchange-traded derivatives are valued at their market values, while for OTC derivatives such as CDS fair values are determined by fund boards. That is why I use market (fair) value notation for CDS in the following.

[11] In 2009, the G-20 member states met in Pittsburgh, Pennsylvania due to the aftermath of the financial crisis 2007-2009. This lead to the enactment of the Dodd-Frank-Act in 2010 in the U.S. and the European Market Infrastructure Regulation (EMIR) and Alternative Investment Fund Managers Directive (AIFMD) in Europe, which take effect in year 2013 and 2014, respectively. See "The Pittsburgh Summit: Key Accomplishments", September 25, 2009, [http://www.state.gov/e/eb/ecosum/pitt sburgh2009/resources/165061.htm, visited on 05.12.2012].

Overall, U.S. fund regulation is less strict regarding the use of direct leverage than German/EU regulation. A final conclusion about indirect leverage is difficult to make because rules are structured differently under both regulatory regimes. Nevertheless, funds in both countries can obtain derivatives with a notional amount higher than their net assets. Thus, depending on the type of derivatives used, a fund could reach the point at which default is theoretically possible due to its investments in derivatives alone. The analysis further reveals that, under existing issuer-oriented rules, funds in the U.S. are able to alter their asset allocations and risk profiles to a large extent using derivatives without being detected by the public and regulators. Thus, regulators in both countries should rethink whether the current level of flexibility is desirable from the perspective of investors (especially unsophisticated ones) and consider implementing some of the modifications proposed in the following text.

The paper is structured as follows. Section 2 presents regulation in the U.S. and Germany/EU regarding mutual fund leverage and derivative holdings and section 3 highlights the similarities and differences between the countries. Finally, section 4 concludes.

2 U.S. and German/EU Regulation of the Use of Derivatives and Leverage by Mutual Funds

Derivatives are generally defined as financial instruments whose value derives from the value of other underlying variables (Hull (2012)). The market value of derivatives is often zero at contract initiation or close to zero soon afterwards and the notional amount describes the contract size (and sometimes expresses the highest possible loss realizable for the derivative). The main characteristic of derivatives is that they generate leverage in the form of a bet on an underlying position that is much higher than the initial investment (premium), which amplifies the volatility of fund returns. Consequently, depending on the type of derivative used, the fund might incur significant losses. On the other hand, derivatives facilitate risk sharing among investors, improve price discovery and make the allocation of capital more efficient.[12] However, according to Stulz (2010), the perception of derivatives as instruments that increase economic welfare declined after the financial crisis of 2007-2009. In the following, I present the current regulation for several types of derivatives in the U.S. and Germany and analyze issues that might arise due to the use of CDS.

[12] The last sentences refer to McDonald (2009), p. 1-8, Stulz (2010), and the SEC Release 10666 (1979), p. 25129. Typically, if a fund holds a portfolio of bonds, it is exposed to the sum of the nominal values of those bonds. If the same fund invests its money primarily in derivatives that replicate securities, its exposure to bonds – measured by the sum of the notional amounts of the contracts – could be multiple times higher than if it were to invest in bonds directly (depending on the price of the derivatives compared to the price of regular bonds). This is comparable to, for example, directly borrowing money and investing it in the derivatives' underlying positions.

2.1 Regulation of Investment Management Companies in the U.S.

Investment management companies offer pools of securities and assets to investors, which allow them to diversify their portfolios and to acquire professional asset management by an investment adviser. In the U.S., these investment vehicles are registered with the SEC and fall under the provisions of the Investment Company Act ("ICA") passed by the U.S. Congress in 1940.[13] In general, regulation in the ICA is complemented by SEC Releases and the SEC staff responses to written requests of interested parties with respect to the application of the federal securities laws to proposed transactions (the latter are called "no-action" letters). The securities of investment management companies are subject to the standardized disclosure and reporting requirements of the federal securities laws (e.g., the ICA, the Financial Accounting Standards Board (FASB) rules, the Securities Act of 1933, and the Securities Exchange Act of 1934) and their investment advisers are required to register with the SEC under the Advisers Act of 1940. Investment companies which register their securities offerings under the Securities Act of 1933 are generally allowed to offer and sell their securities to the broader public (including unsophisticated investors). Most of the investment companies also have a board of directors, a majority of whom are independent from the respective investment adviser and perform the role of independent "watchdogs" acting in the interest of investors.[14]

Although the ICA imposes only a few substantive limits on mutual fund investments, multiple operational restrictions exist to protect investors against conflicts of interest with the advisers (principal-agent problems). For instance, these important regulations specify the way to compute a fund's net asset value (section 2(a)(41) of the ICA), limit leverage, as well as detail certain trading strategies.[15] Regarding leverage and derivatives, the following rules of the ICA are relevant:

- Senior securities limitations regarding leverage according to section 18,
- Diversification provisions of sections 5(b)(1) and 13(a)(1) in conjunction with valuation based on sections 2(a)(36) and 2(a)(41),
- Portfolio concentration rules of sections 8(b)(1)(E) and 13(a)(3),
- Investing in securities-related issuers according to section 12(d)(3),

[13] Section (sec.) 5(a)(1) of the ICA defines an "open-end company" as "a management company which offers for sale or has outstanding any redeemable security of which it is the issuer."
[14] Also see the SEC Release 24083 (1999) regarding the responsibilities of the independent board members. Since 2007, only one independent member on the management board is required in Germany (§ 6a Investment Act/Investmentgesetz [2007]).
[15] Information contained in this paragraph refers to the SEC Staff report (2003), p. 5-7, the SEC Staff report (1994), p. 27, and the SEC Concept Release on Derivatives (2011), p. 23 fn. 68.

- Accounting and financial statement reporting (section 30(e)) and applicable disclosure provisions of section 8(b) and items 4(a), 4(b), 9(b), 9(c), and 16(b) of Form N-1A (registration statement),
- Other rules on the effect of derivative use on the liquidity of the fund's portfolio, ICA regulations relating to custody (section 17(f)), and fund names (section 35(d)).[16]

Table 1 summarizes the most important provisions.

Table 1: ICA provisions on derivative use and leverage by U.S. investment funds

Issue	Content of the regulation
1.) Senior Securities Limitations on Leverage (sec. 18(f) of the ICA)	
Controlling Leverage	Issuing any class of "senior security" is prohibited; however, mutual funds are allowed to borrow from banks if they maintain a 300%-asset coverage for those borrowings (thus, direct leverage is allowed up to 33.33% of a fund's net assets).
Controlling exposure to derivatives that create third party obligations (indebtedness), e.g., futures, forward contracts, written options (and securities-lending transactions, e.g., short sales)	Funds are allowed to engage in "senior security transactions" involving leverage like derivatives and securities-lending transactions only if they provide coverage (set aside assets or enter into offsetting positions) equal to at least the value of the potential obligations from these transactions.
Derivatives not involving indebted-ness, such as purchased stock call options and leveraged inverse floating rate bonds	Funds using derivatives that do not impose any payment obligations above the initial investment (i.e., premium) do not face leverage restrictions as these derivatives do not fall under sec. 18(f) of the ICA.
2.) Diversification Requirements (sec. 5(b)(1) and 13(a)(1) of the ICA)	
Controlling exposure to different issuers through derivatives becomes relevant if funds are classified as diversified according to sec. 5(b)(1) of the ICA	A diversified fund is not allowed to invest more than 5% of its value in the securities of any one issuer (and in no more than 10% of the outstanding voting securities of this issuer) for 75% of its asset value.

[16] Information in this paragraph is based on the SEC Staff report (2003), p. 6-7.

Issue	Content of the regulation
3.) Portfolio Concentration Rule (sec. 8(b)(1)(E) and 13(a)(3) of the ICA)	
Controlling exposure to different industries through derivatives becomes relevant if funds state that they are either concentrated in a particular industry (or group of industries) according to 8(b)(1)(E) of the ICA, or starting to concentrate through the use of derivatives	Concentration within an industry is assumed to take place whenever a fund invests more than 25% of its assets in an industry. To prevent funds from substantial changes of their nature and policies without shareholder approval, they have to state on the registration statement whether they concentrate investments in a particular industry or a group of industries. All investments must be considered.
4.) Limitations on Investing in Securities-Related Issuers (sec. 12(d)(3) of the ICA)	
Controlling exposure to securities-related issuers of derivatives	Funds are generally not allowed to purchase any security issued by (or acquire an interest in the business of) a broker, dealer, underwriter, or investment adviser ("securities-related issuer"). According to rule 12d3-1 of the ICA, funds are exempt from this prohibition under specific conditions, which allow them to invest up to 5% of the fund's total assets in the securities issued by these issuers.

2.1.1 General Leverage Restrictions in the U.S.

Section 18(f) of the ICA is the most relevant piece of regulation regarding leverage. It prohibits mutual funds from issuing any class of "senior security" (leveraged capital structures) in order to avoid exploitation of senior bondholders and/or to limit the volatility of investments. Bonds, debentures, preferred stock, or bank loans are considered senior capital.[17] However, mutual funds are allowed to borrow from banks provided they maintain a 300 percent asset coverage for these borrowings (i.e., direct leverage of up to 33.33% of a fund's net assets is allowed).[18] The following additional rules apply to securities-lending and derivative transactions that cause potential obligations to a third party and, in principle, constitute prohibited "senior securities".

[17] The last two sentences refer to the SEC Staff report (1994), p. 26-28. According to sec. 18(g) ICA, a "senior security" can be "any bond, debenture, note, or similar obligation or instrument constituting a security and evidencing indebtedness, and any stock of a class having priority over any other class as to the distribution of assets or payments of dividends; and 'senior security representing indebtedness' means any senior security other than stock." Under the ICA, the definition of "security" includes any kind of "indebtedness". See the SEC Concept Release on Derivatives (2011), p. 19 footnote (fn.) 57.

[18] Some limited private and temporary borrowings (up to 60 days and max. 5% of a fund's value) are excluded from the definition. See sec. 18(g) ICA. ''Asset coverage'' of a senior security (representing the indebtedness of an issuer) refers to the ratio of the value of the total assets of the issuer minus all liabilities and indebtedness unrelated to senior securities to the aggregate amount of senior securities. See sec. 18(h) ICA.

The use of derivatives increased in the 70s following the departure from the Bretton-Woods system (Hull (2012)). In 1979, the SEC stated in its Release 10666 that "leverage exists when an investor achieves the right to a return on a capital base that exceeds the investment which he has personally contributed to the entity or instrument achieving return."[19] In the same release, the SEC required funds to cover the potential obligations to a third party for a number of transactions, such as reverse repurchase agreements, forward contracts, and written put contracts, in order to prevent these transactions from being construed as the prohibited "senior securities". From then on, fund boards were required to detect the implicit leverage of other transactions that should be subject to this "coverage requirement".[20]

Later, the SEC distinguished between derivatives that create potential obligations to a third party (indebtedness) and derivatives that create the economic equivalent of leverage (not by imposing any payment obligations above the initial investment, but rather providing a gain potential above the initial investment). Funds using derivatives that create indebtedness, e.g., future contracts or written options, are required to cover the potential obligations to a third party. By contrast, funds using derivatives that create the economic equivalent of leverage, e.g., purchased options that grant the right to unlimited gains while restricting losses to the amount of the initial investment, do not fall under the coverage regime.[21] Additionally, sec. 12(a) of the ICA regulates margin purchases and short sales, which can also increase leverage. This rule prohibits all margin purchases except for short-term credits necessary for clearing transactions and short sales. However, under sec. 18(f) of the ICA, the SEC agreed not to enforce the rule if a fund engaging in short selling provides sufficient coverage as required for derivatives.[22] In order to quantify the potential future obligations from long derivative positions, the SEC recommends using the purchase, or exercise price, of a contract (minus the margin on deposit). For short positions (short selling), the SEC recommends using the market value of a security[23] and the full amount of the reference asset (i.e., the notional amount) underlying the

[19] SEC Release 10666 (1979), p. 25129 fn. 5.
[20] In its Release 7221 from 1972, the SEC mentioned, in the context of funds trading commodities, the requirement to cover for the first time. See **Appendix A** and the SEC Staff No-Action Letter to Dryfus (1987).
[21] A purchase of a call creates economic leverage where one can only lose the premium paid to purchase the call, but theoretically gain an infinite amount, whereas the sale of a call creates leverage in the sense of indebtedness to a third party because one can lose much more than the premium paid by the buyer (i.e., the difference between exercise price and market value of the underlying position). See the SEC Staff report (1994), p. 24-26. Similar reasoning applies for the purchase and sale of CDS protection, which can be seen as options on a company's creditworthiness.
[22] See **Appendix A**, the SEC Staff No-Action Letter to Dryfus (1987), p. 2, and the SEC Staff No-Action Letter to RSIT (1995).
[23] Regarding short selling, a fund is required to maintain in "segregated accounts" an amount reaching the current market value of the security sold short (decreased by the amount of collateral deposited with the broker). See the SEC Staff No-Action Letter to RSIT (1995), p. 3. Alternatively, the fund does not need to segregate assets if it covers selling a security short by owning that security or holding a call option on that security with a strike price less than the selling price of the security. See the SEC Staff No-Action Letter to Dryfus (1987), p. 2.

contracts (e.g., derivatives).[24] **Appendix A** shows the amount originally required to cover derivatives, including forwards, futures, options, swaps, and short selling.

Under U.S. regulation, funds using CDS are required to distinguish between contracts for buying (long) and selling (short) protection. Similar to derivatives that create the economic equivalent of leverage, buying protection against the default of a bond via CDS does not require a fund to follow the coverage rules mentioned above since it does not impose payment obligations above the initial investment (CDS spread).[25] When a fund sells default protection using CDS, however, it effectively adds leverage (indebtedness) to its portfolio, because it is exposed to the notional amount of the swaps beyond its total net assets. Hence, according to the SEC, in order to be exempt from the prohibition of issuing "senior securities", a fund must cover the amount of potential future obligations, which would equal the notional amount. However, taking the CDS notional amounts as indicators for coverage is a conservative approach as it ignores the offsetting potential of the recovery values of CDS references.

In order to comply with the coverage requirement, funds using derivatives that create indebtedness originally had to establish "segregated accounts" with a custodian (comparable to margin accounts) comprising sufficient levels of cash, U.S. government securities, or high-grade debt securities. Typically, securities segregated on the records of the custodian were unavailable for sale or other disposition (deemed frozen).[26] Since 1997, however, funds are no longer required to establish a segregated account with a custodian and can segregate assets themselves.[27]Beyond limiting a fund's potential leverage, segregated accounts also serve as a source of payments for future obligations. Since 1987, underlying instruments of the relevant derivatives or other offsetting instruments are

[24] The last two sentences refer to the SEC Concept Release on Derivatives (2011), p. 26. The SEC stresses that there are at least two ways to value a derivative: via the current market value, which reflects the price at which the derivative could be expected to be liquidated; and the notional amount, which reflects the contract size valued at current price. See the SEC Concept Release on Derivatives (2011), p. 8-9.

[25] Buying CDS default protection is equivalent to shorting a bond that has an unknown future purchase price – unless a defined credit event occurs (e.g., the recovery value in case of default). If a defined credit event occurs, the fund gets the notional amount of the insured bond from the counterparty and provides the defaulted bond to the counterparty or, if a cash settlement was agreed upon, receives the net amount owed by the counterparty under the contract (minus any margin that must be posted under a standard ISDA contract). However, rules on short selling might be applicable if the two contract parties agree on a physical settlement, and require the fund to keep the underlying in its portfolio (as determining the amount of assets needed for coverage is difficult, because of the ex-ante unknown recovery value of the underlying). Please refer to the information contained in **Appendix A**.

[26] See the SEC Release 10666 (1979), p. 25131-25132 and the SEC Concept Release on Derivatives (2011), p. 22 fn. 65. In general, sec. 17(f) ICA requires investment companies to maintain their securities in the custody of a bank. Alternatively, they can maintain custody with a national securities exchange, securities depository, future commission merchants, commodity clearing organizations, and on their own books (self-custody). However, many derivatives by their nature require depositing collateral or margins to third parties to support the credit exposure to counterparty. See the CFRS Derivatives and Leverage Report (2010), p. 37-38.

[27] The last two sentences refer to the SEC Staff No-Action Letter to MLAM (1996), the SEC Staff Letter from Lawrence A. Friend (1997), p.3, and the SEC Concept Release on Derivatives (2011), p. 25-26. In the following, coverage refers to either asset segregation or entering into offsetting positions by the fund.

deemed suitable for coverage.[28] In 1996, the SEC extended the range of assets that could be segregated to any liquid asset, including equity securities and non-investment grade debt securities, given they are liquid and valued daily.

Hence, potential third party obligations from derivatives and securities-lending transactions, as measured by the sum of the purchase/exercise price and notional amount of the derivative together with the current market value of securities "sold short", might theoretically reach 100% of a fund's total net asset value (TNA). However, the SEC observes that U.S. funds often use the market value of derivatives instead of the notional amount to measure the potential future obligations in case of swaps for "segregation". Some funds also disclose that they segregate the daily mark to market liability when using futures or forwards that require cash-settlement.[29] This is likely due to the fact that in 1989, in connection with the review of fund registration statements, the SEC non-publicly acquiesced the segregation of the net amount due on the contract for interest rate swaps.[30] Later in 2005, the SEC (informally) indicated that a fund may segregate assets equal to the daily net amount owed under the contract for cash-settled futures and forwards (minus any margin that must be posted with a futures commission merchant). Today it is unclear whether funds segregate smaller amounts than originally required for all or only some types of derivatives and whether they do so in order to be more flexible in trading. Further research is needed on this issue. Nevertheless, U.S. funds might use this kind of "under segregation" to further increase their derivative holdings and eventually also indirect leverage without being detected by regulators. Overall, the SEC provides insufficient guidance for the application of the above derivative provisions.

A fund can hold all of its net assets as collateral in segregated accounts for selling CDS with a notional value equal to the net assets of a fund as long as no other type of derivatives is used. However, this approach ignores whether the fund uses these derivatives to implement non-speculative or speculative investment strategies. In consequence, a fund selling protection via CDS for non-speculative purposes (e.g., to synthesize bonds) is treated as one pursuing speculative investment strategies (e.g., to capitalize on credit market timing). Non-speculative investment strategies would create (unlevered) bond positions by selling protection via CDS while simultaneously increasing the notional value of Treasury securities to the level of the CDS notional value in order to avoid higher costs that would eventually be incurred by buying bonds in the market (Oehmke and Zawadowski (2013)). By contrast, speculative investment strategies would in fact add leverage to its portfolio by

[28] In the case of sold call options, this could be underlying securities (stocks) or offsetting positions, such as purchased call options. See **Appendix A** and the SEC Staff No-Action Letter to Dryfus (1987). Once transactions are covered, there is no reason to worry about undue leverage or speculation, which sec. 18 ICA protects against. See the SEC Release 10666 (1979), p. 25131-25132.

[29] The last two sentences refer to the SEC Concept Release on Derivatives (2011), p. 26.

[30] For further information, please refer to **Appendix A**, and the CFRS Derivatives and Leverage Report (2010), p. 14-18.

selling CDS because it would be exposed to the notional amount of the swaps beyond its total net assets invested elsewhere.

As an example, take two investment grade funds: one holding government bonds and the other only investing in asset-backed securities (ABS) (for simplicity, a residual cash position is ignored). If the first fund sells CDS on ABS with a notional amount equal to the fund's TNA, it effectively generates ABS equal in value to a fund's TNA. If the other fund, which is already invested in ABS, also sells CDS on ABS with a notional amount equal to the fund's TNA, it will be subject to investment exposure on the notional amount of the swaps in addition to its total net assets. Under U.S. regulation, both funds would have to "segregate" all of their net assets to be able to pay their potential obligations. However, in the face of unexpected shocks, which might substantially decrease the value of the ABS, the fund originally investing in ABS would eventually be unable to meet all its financial obligations from short CDS on ABS. This is possible because the value of the segregated ABS quickly decreases (and hence, so does the fund's current TNA) and some of the potential obligations out of the short CDS contracts, which are equal in value to the old level of TNA, become due. For the fund investing in government securities, the potential obligations out of the short CDS contracts, which are equal in value to the fund's TNA (before the decrease in value of ABS is observable), also become due. However, the value of its segregated government securities will remain mostly unaffected (or even positively affected due to the "flight to liquidity" effect) by this shock and remain sufficiently high to cover the obligations.

If the same funds were underestimating the amounts required for segregation by considering market values instead of notional amounts for CDS selling protection, it would allow them to increase indirect leverage even more and leave room for extensive risk-taking. Following the main idea of U.S. derivatives regulation, which restricts the level of potential obligations arising out of derivatives that incur an actual or contingent liability beyond their purchase price, it seems unreasonable to use market values that reflect expected values of future obligations at valuation date instead of using the much higher notional amount for short CDS.[31] As observed during the financial crisis, prices and expectations at reporting date can change very quickly.

Additionally, the U.S. general leverage restriction does not prevent funds from increasing the volatility of their returns by using derivatives that create the economic equivalent of leverage (derivatives that do not incur actual or contingent liability beyond the premium payment). This follows from the fact

[31] For purposes of calculating TNA under the ICA's valuation regulations, derivatives are generally valued using market value for exchange-traded derivatives and fair value for OTC derivatives; both reflect the value at which the derivative could be sold or transferred at the relevant time. This way the price at which fund shares are purchased/redeemed, is fair and does not result in dilution of investors' share holdings. See the SEC Release 26299 (2003), p. 74718.

that the regulation focuses more on prohibiting funds from issuing senior securities rather than on limiting the volatility of investments.[32] As long as derivatives are used for hedging purposes, the volatility of returns decreases. For example, funds might buy CDS to protect themselves against a bond's default (or from counterparty's default). By contrast, if such derivatives are used for speculative purposes, the volatility of returns increases although the fund does not incur actual or contingent liability beyond the premium. For instance, funds can buy protection via CDS on a large scale on bonds that are neither included in their portfolio, nor correlated with securities contained in their portfolio, as a kind of bet on the creditworthiness of the respective companies, thereby exposing investors to heightened risks. This might not be in the best interest of investors since a fund that extensively uses this kind of long CDS, i.e., keeps CDS notional values of the size of a fund's assets (or higher), could lose a significant percentage of its portfolio value for premium payments if its bets are inaccurate.

Although disclosure rules will be discussed later in the text, the following quote from the Statement of Additional Information (SAI) of the PIMCO fund family exemplifies how funds handle their CDS exposure: *"The Fund's obligations under a credit default swap agreement will be accrued daily (offset against any amounts owing to the Fund). In connection with credit default swaps in which a Fund is the buyer or the seller, if the Fund covers its position through asset segregation, the Fund will segregate or 'earmark' cash or liquid assets with a value at least equal to the Fund's exposure (any accrued but unpaid net amounts owed by the Fund to any counterparty), on a marked-to-market basis (when the Fund is the buyer), or the full notional amount of the swap (minus any amounts owed to the Fund) (when the Fund is the seller). Such segregation or 'earmarking' seeks to ensure that the Fund has assets available to satisfy its obligations with respect to the transaction and could have the effect of limiting any potential leveraging of a Fund's portfolio."*[33]

This implies that the leverage restriction, as well as the obligation to hold enough liquid assets to meet payment obligations and redemption requests immediately,[34] guarantee that funds consider short CDS at notional amounts and long CDS at their negative market (fair) values.

Under the current leverage regulation, funds have a high amount of flexibility to use derivatives, which is exemplified by the possible use of CDS and indicative of potentially adverse consequences for investors. This flexibility stems from unspecific rules that have been partly relaxed over time, making the regulation nontransparent. However, various summary documents perceive the limitations on leverage differently. For example, the Investment Company Institute claims these

[32] See the CFRS Derivatives and Leverage Report (2010), p. 14-18.
[33] SAI of the PIMCO fund family (2013), p 42.
[34] See the SEC Release 10666 (1979), p. 25128, the SEC Staff report (1994) and the SEC Staff report (2003).

limitations greatly minimize "the possibility that a fund's liabilities will exceed the value of its assets."[35] Regulators could significantly improve investor protection by revising the existing rules to measure derivatives exposure in a conservative way, i.e., by notional amounts and purchase/exercise prices (as originally suggested by the SEC), or by introducing clear and easy to enforce rules. If the goal is to protect unsophisticated investors from losing their entire investment due to a fund's derivative holdings, the potential obligations from the speculative use of derivatives should be smaller than its TNA. For example, in Ireland, the maximum potential exposure from speculative use of derivatives is limited to 25% of TNA for non-UCITS investment companies offered to the public.[36]

Another approach could restrict the exposure from all derivatives on a notional basis as well as limit the notional amounts of derivatives used for speculation to a reasonable level (it is up to the regulator to decide what constitutes a reasonable level).[37] On the one side, the restriction on the notional amount of all derivatives could be equal to, e.g., a fund's TNA, and still allow funds to benefit from the use of derivatives for non-speculative purposes. On the other side, the notional amounts of derivatives used for speculation could be limited to 50% of a fund's TNA (or to the even more conservative level of 25%, as in the case of Ireland). This type of combined approach, together with the obligation to hold a sufficient amount of liquid assets in order to meet payment obligations and redemption requests at any time, could replace the necessity for coverage. Although the above combined approach (or another simple approximate) might imperfectly measure derivative exposure, it can still be effective for the purposes of regulation. Alternatively, one could limit the volatility of fund returns by prescribing funds to use sophisticated methods of risk calculation, such as the Value-at-Risk (VaR) approach, which is currently applicable under German/EU regulation (CESR Guidelines (2010)). However, this might be difficult to implement and make comparisons across funds unreliable.

2.1.2 The Treatment of Derivatives under Issuer-Oriented Rules in the U.S.

As stated before, two kinds of exposure are important for the use of derivatives – exposure to the issuer of the underlying asset of the derivative (reference issuer risk) and to the issuer of the derivative itself (counterparty risk). These types of exposure are accounted for under various issuer-oriented rules in the U.S., which restrict investments in the securities of one particular issuer to a certain percentage of a fund's assets. The most important issuer-oriented rules are presented and discussed in the following subsections.

[35] ICI Fact Book (2013), p. 221.
[36] See the SEC Concept Release on Derivatives (2011), p. 35.
[37] The exposure from selling CDS protection, together with the exposure generated by buying CDS protection on the notional basis, would be considered (if both are used for speculation) and limited to a reasonable level. Conceptually, this would be comparable to the commitment approach under German/EU regulation, which mainly focuses on the market values of the underlying positions of derivatives for funds that use (negligibly) complex derivatives or/and simple derivatives.

2.1.2.1 ICA Diversification and Portfolio Concentration Rules and Derivatives

According to section 5(b)(1) of the ICA, funds are obligated to "disclose in their registration statement whether they are classified as diversified or non-diversified."[38] Funds are also required to state whether they concentrate investments in a particular industry or in a group of industries in the registration statement (8(b)(1)(E) of the ICA).[39]

ICA Diversification Requirement and Derivatives

A fund classified as diversified is not allowed to invest more than 5% of its TNA in the securities of one particular issuer (and keep more than 10% of the outstanding voting securities of this issuer) for 75% of the value of its assets (5(b)(1) of the ICA). The diversification requirement guarantees a fund's independence from a few issuers and protects against controlling portfolio companies (SEC Concept Release on Derivatives (2011)). A fund that does not meet the above described requirements is a non-diversified fund (5(b)(2) of the ICA). However, according to subchapter M regulation of the Internal Revenue Code (IRC), even a non-diversified fund is required to diversify 50% of its assets in a similar way; otherwise it would be subject to taxation on its income or capital gains at the entity level (ICI Fact Book (2013)). A diversified fund can become a non-diversified fund only after obtaining the approval of shareholders (13(a)(1) of the ICA).

The relevant value of the total assets of a fund (2(a)(41) of the ICA) is determined at the end of its last proceeding fiscal quarter (including the value of the derivatives). Derivatives fall under the definition of securities as "notes" or "evidence of indebtedness" (2(a)(36) of the ICA).[40] The value of portfolio securities depends on the existence of market quotes and the securities belonging to the portfolio at the end of its last proceeding fiscal quarter (2(a)(41) of the ICA). If those two requirements are met, the value of the security is simply the market value at a particular point in time. If market quotes are unavailable, the value of the security or asset is equal to its fair value, as determined in good faith by the fund's board of directors; for securities or assets purchased after the end of the fiscal quarter their costs are relevant (sec. 2(a)(41) of the ICA). However, it is unclear whether only the reference-issuer exposure of the derivatives or if both the reference and counterparty exposure should be considered for the purposes of the diversification rule.[41] Further, the SEC observes that the application of the mark to market valuation for derivatives could allow a fund to "maintain an ongoing exposure to a single issuer or group of issuers in excess of 5% of the fund's assets on a

[38] SEC Concept Release on Derivatives (2011), p. 49. This is the U.S. analog to the German 5% issuer limit.
[39] See the SEC Concept Release on Derivatives (2011), p. 63.
[40] For an extensive discussion on this issue, please refer to the SEC Concept Release on Derivatives (2011), p. 49, fn. 134.
[41] See the SEC Concept Release on Derivatives (2011), p. 53. Under this rule, the counterparty exposure of a fund is eventually accounted for at the positive market value of the derivative. If a fund buys default protection via CDS on specific underlying positions from a bank, the positive market (fair) values of long CDS (minus margins provided by the counterparty under the standard ISDA agreements) reflects the current claims of the fund.

notional basis, while continuing to classify itself as diversified."[42] Due to the fact that market values of derivatives do not reflect "the asset base on which future gains and losses will be based or otherwise represent the potential future exposure of the fund under the derivatives investment"[43], the SEC questions whether the application of the notional value, instead of the liquidation value, would better fulfill the diversification requirements.[44]

Restricting the continuing exposure to a single issuer (or group of issuers) to below 5% of a fund's assets on a notional basis would, in the case of short CDS, reduce a fund's dependence on a few reference issuers more effectively than by limiting the market (fair) value of CDS. Moreover, the sources of leverage at the transaction level would be restricted. However, an even more precise approach for the diversification rule could require distinguishing between derivatives used for hedging and non-hedging purposes and limit those used for non-hedging purposes under the diversification rule, depending on the economic exposure created in combination with other securities. For example, hedging a portfolio against the default of a particular bond through buying default protection via CDS on the bond creates a risk-free security and thus, there is no need to account for the credit risk the fund faces with regard to this particular issuer (however, the counterparty exposure also increases in parallel). Likewise, if a fund buys or sells default protection via CDS to offset existing positions in short or long CDS, it is no longer dependent on the reference issuers and thus, there is no additional risk. By contrast, selling default protection via CDS on a corporate issuer creates a synthetic bond position that exposes the fund directly to the reference issuer – similar to a regular bond. Under the current diversification rule, relying on the small market (fair) values of the CDS selling protection undervalues this exposure and allows funds to change their asset allocation and risk profile. For instance, investment grade funds could sell protection on risky issuers via CDS to a large extent without being detected by regulator or investors. As current rules restrict investments in securities of specific issuers by considering regular stocks and bonds at market values, using the market values of the underlying positions of derivatives when appropriate would be an even more precise approach, which is applied by funds in Germany/the EU.[45]

[42] SEC Concept Release on Derivatives (2011), p. 52. For example, a diversified fund may invest three percent of its assets in securities of an issuer and, additionally, sell CDS protection on this particular issuer with a notional equal to six percent of TNA. This would create an exposure equal to another six percent of the fund's assets as measured by notional and yield a combined exposure to the issuer of nine percent of the fund's total assets. Although the total exposure to this particular issuer is over five percent of total assets on a notional basis, one would observe a mark to market value of CDS that is lower than one percent of a fund's TNA. This scenario is based on the SEC Concept Release on Derivatives (2011), p. 52, 29.

[43] SEC Concept Release on Derivatives (2011), p. 52.

[44] See the SEC Concept Release on Derivatives (2011), p. 53.

[45] The continuing exposure to a single issuer must also remain below 5% of TNA. **Appendix C** shows the commitment values for a selection of derivatives that need to be considered under German/EU issuer rules. Since the market (fair) value of the CDS reflects the difference between market value of the underlying position and the notional amount, the market value of the underlying position can be obtained by adding the market value of the CDS to the notional amount.

Portfolio Concentration Rule and Derivatives

Focusing on one particular industry may be necessary with respect to the investment objective, but it can increase the riskiness of the fund due to a lower level of diversification as compared to funds that are more diversified. Concentration within an industry is assumed to take place whenever a fund invests more than 25% of its assets in one industry.[46] Furthermore, funds are required to obtain shareholder approval before substantially changing their nature and policies (13(a)(3) of the ICA). Standard industry definitions are not provided in the U.S. and instead, funds determine the classifications for themselves (however, the economic characteristics of companies within each classification may not substantially differ).[47]

The wording of the concentration requirement does not encompass derivative transactions.[48] However, entering into a derivative contract can generate exposure to many industries. For example, if a fund sells protection via CDS on a corporation from the durables industry (issuer of the reference asset), it gains exposure to the durables industry to the extent expressed in the market values of the CDS underlying positions (or alternatively in CDS notional amounts). By contrast, when buying CDS on durables from a bank (counterparty) the fund is exposed to the financial industry. Current claims of the fund would be reflected by positive market values of the CDS (while the highest potential claims would be reflected by the notional amount minus any collateral provided by the counterparty). Under this rule, derivatives can be considered at their market values or notional amounts; market values potentially underestimate a fund's economic exposure to a particular industry through derivatives, whereas the notional amounts potentially overestimate the same exposure. Although it is important for funds to consider exposure to industries, they seem to do so only with regard to the reference issuers of derivatives (and not counterparties), and at market (and not notional) values[49] with similar consequences to what was described under the diversification rule.

In my view, the diversification and concentration rules serve similar purposes by guaranteeing diversification with regard to issuers (diversification rules) and industries (concentration rules). To prove compliance with these rules, one could focus on the reference-issuer exposure only. Existent rules such as the U.S. limit on investing in securities-related issuers and the global rules on mandatory central clearing are sufficient to capture the counterparty risk (these will be discussed in the next

[46] See Instruction 4 Item 9 of Form N-1A, [http://www.sec.gov/about/forms/formn-1a.pdf, visited on 29.03.2012], and the SEC Release 23064 (1998), p. 13927, nn. 98-99.
[47] See the SEC Schwab Amicus Brief (2010), p. 2-3, 7-8.
[48] See the SEC Concept Release on Derivatives (2011), p. 65-66.
[49] The last two sentences refer to the CFRS Derivatives and Leverage Report (2010), p. 29-30, and the SEC Concept Release on Derivatives (2011), p. 65-66.

subsection).[50] However, rules restricting investments in securities of specific issuers could better account for the reference-issuer exposure from derivatives by considering how derivatives are used in combination with other securities for non-hedging purposes, and relying on the market values of derivatives and the underlying positions of the derivatives (or alternatively, notional amounts). Otherwise, funds are able to circumvent the goal of both rules and change their asset allocations and risk profiles simply by selling CDS and relying on their small market (fair) values.

2.1.2.2 ICA Limitations on Investing in Securities-Related Issuers Through Derivatives

Section 12(d)(3) of the ICA is important if a fund's use of derivatives generates exposure to securities-related issuers. Funds are generally not allowed to purchase any securities issued by (or acquire interest in a business of) any person who is a broker, dealer, underwriter, or investment adviser ("securities-related issuer"). The restrictions on the exposure to securities-related issuers should prohibit funds from risky investments in illiquid businesses of such issuers and, moreover, from exploitation by fund sponsors, who could otherwise take advantage of the funds they sponsor. This restriction applies to all investment companies irrespective of their diversification status and is also important when a fund purchases OTC derivatives (but not if derivatives are exchange-traded or otherwise centrally cleared). Whenever a derivative counterparty is a securities-related issuer, the transaction might be equivalent to the acquisition of securities issued by (or interest in) this issuer.[51]

Under rule 12d3-1 of the ICA, if transactions are not considered to be acquisitions of interest in a securities-related issuer and the following conditions are met, funds can invest up to 5% of their total assets in the securities (valued at market values) of a securities-related issuer. Funds are allowed to purchase securities of (a) any securities-related issuer that earns 15% or less of its gross revenues from "securities-related activities", provided that the fund does not control such person after acquisition. Alternatively, the securities-related issuer can (b) earn more than 15% of its gross revenues from "securities-related activities", provided that after the acquisition of equity (debt) securities, the fund does not own more than 5% (10%) of the outstanding securities of that class of the issuer's equity securities (of the outstanding principal amount of the issuer's debt securities). Thus, the above exemption could be used by a fund that acquires OTC derivatives from a securities-related issuer. In this situation, a derivative would be categorized as a debt security and subject to the above mentioned 10% debt limitation of rule 12d3-1 of the ICA under which funds are allowed to

[50] The Committees of Federal Regulation of Securities advocate including the market value of the derivative reference assets in the calculation and ignoring the counterparty because of the disclosure-based nature of the diversification and concentration requirement under the ICA. See the CFRS Derivatives and Leverage Report (2010), p. 29-30.

[51] The information contained in this paragraph derives from the SEC Release 13725 (1984), the CFRS Derivatives and Leverage Report (2010), p. 29-33 and the SEC Concept Release on Derivatives (2011), p. 59, 62-63.

account for derivatives at their market values or notional amounts. However, the SEC observes that funds often, but not always, use notional amounts to perform these calculations.[52]

However, the exemption would still prohibit transactions if a derivative is not a security issued by the counterparty, but instead perceived as a fund's acquisition of "interest in" a securities-related issuer. How to discriminate between the two cases remains unclear; an analysis of the fund's exposure to a reference asset underlying the derivative might be required.[53] In general, whenever there is dependency between the fund and the securities-related issuer of the reference asset of a derivative, especially when the securities-related issuer is a credit support provider, funds have to consider this relationship under rule 12(d)(3) of the ICA.[54]

All derivative counterparties are generally securities-related issuers.[55] If derivatives are securities issued by a securities-related issuer (and not prohibited acquisitions of interest in their businesses), they are considered at their market values under the 5%-limit under rule 12d3-1 of the ICA, as for other securities. For example, whenever a fund buys protection via multiple non-centrally cleared CDS contracts written by a securities-related issuer, their notional amount would be used to check whether the exemptions of rule 12d3-1 of the ICA are fulfilled (i.e., if a fund's notional of all debt securities including CDS lies below 10% of the outstanding principal amount of the securities-related issuer's debt securities). Alternatively, the market (fair) value of the CDS could be used to check compliance with this condition. If this condition is met, the fund might invest 5% of its assets in CDS (and other securities) of a particular securities-related issuer and, as required under current regulation, value these securities at their market values. When using the market values of derivatives to test whether debt securities of a particular issuer (including CDS) lie below 10%, the potential exposure to counterparties on a notional basis may, in fact, be multiple times higher than suggested by the market values.[56] This may create a problem if economic conditions change quickly (e.g., as happened during the financial crisis of 2007-2009). As long as all funds are required to make the first

[52] Refer to the SEC Concept Release on Derivatives (2011), p. 58-60, 62-63. Under rule 12d3-1 ICA, all securities, except equities, are recognized as debt securities. See the SEC Concept Release on Derivatives (2011), p. 58 fn. 156.

[53] The CDS reference-issuer exposure from securities-related issuers would eventually have been accounted for under the diversification and portfolio concentration rules at the market (fair) values of the CDS (for which I recommend using the market values of the underlying positions for CDS selling protection, or for simplicity, the notional amounts, to compare them to the limits).

[54] See the CFRS Derivatives and Leverage Report (2010), p. 31, and the SEC Concept Release on Derivatives (2011), p. 59-61. In any case, it is not permitted to acquire a general partnership interest in a securities-related issuer by a fund. See the SEC Concept Release on Derivatives (2011), p. 60.

[55] See the CFRS Derivatives and Leverage Report (2010), p. 33. In the CFRS Derivatives and Leverage Report (2010), it is further recommended to disregard a fund's counterparty exposure from derivatives if payments due to the fund are fully protected by collateral (if the latter is bankruptcy-protected).

[56] See the SEC Concept Release on Derivatives (2011), p. 29, 53. Neither the SEC nor its staff has addressed that the exposure of the fund to its counterparty or the issuer of a reference name may be understated under the calculation if the current market value of the derivative is the appropriate measure (the potential future exposure of the fund to a securities-related issuer is also likely to be unaccounted for by the mark to market standard). See the SEC Concept Release on Derivatives (2011), p. 62.

stage test for debt securities on a notional basis, comparing the market (fair) values of CDS to the 5% limit as currently prescribed by law would be sufficient to prevent funds from suffering significant losses due to counterparty failure.[57] In addition, the new rules implemented by the global community in the near future will further limit counterparty exposure from derivatives.

Recent Developments in U.S. Regulation on Restricting Counterparty Exposure

At the Pittsburgh G-20 Summit held in Pennsylvania on September 24-26, 2009, leaders agreed that all standardized OTC derivative contracts should be required to be cleared by a central counterparty (CCP) and reported to trade repositories by the end of 2012. As a consequence, most derivatives will be traded on swap execution facilities (SEFs) or exchanges and cleared by clearinghouses. The U.S. implemented the relevant regulatory framework for OTC derivatives in Title VII of the Dodd-Frank Act (2010), known as the Wall Street Transparency and Accountability Act of 2010. The Act authorizes the Commodity Futures Trading Commission (CFTC) to regulate "swaps", the SEC to regulate "security-based swaps", and both the CFTC and SEC to regulate the fill-in category of "mixed swaps" capturing both swaps and security-based swaps. The term "swap" incorporates various derivatives: interest rate swaps, foreign exchange (FX) transactions (excluding forward FX)[58], commodity swaps, and certain credit swaps (excluding security-based swaps). A "security-based swap" is a swap referenced on a single security or loan, including CDS written on single issuers (e.g., a company or government), or a small group of securities/narrowly defined index (with fewer than 9 components). Since the implementation of the Dodd-Frank Act, both regulatory authorities have designed new rules for "cleared" swaps and higher capital requirements for "uncleared" swaps. External business conduct standards impose higher due diligence obligations on swap dealers/major swap participants and also require end-users to provide extended documentation.[59]

Central clearing, which was introduced in the U.S. in March 2013, is expected to minimize the impact of a counterparty's default as all contract counterparties are required to post collateral (initial and variation margin) with the CCPs, irrespective of their credit worthiness. In addition, CCPs themselves face stronger capital requirements. At the moment, central clearing is required with regard to interest rate swaps and specific CDS on indices. According to Duffie and Zhu (2011), it is unclear whether or not the expected benefits of the central clearing of derivatives, i.e., substantial reductions in counterparty risk, will be lost due to the fragmentation of clearing services. In addition, the amount

[57] This would be in line with the findings of Helwege and Zhang (2013) – counterparty exposures are small, especially among banks that face diversification regulations (comparable to mutual funds), and do not typically cause a cascade of failures.

[58] The Secretary of the Treasury excludes forward FX transactions involving the physical exchange of a single currency for another (e.g., EUR for USD) from regulation as "swaps". See the SEC & CFTC Release 33-9338 (2012).

[59] For more information and sources, please refer to the "Dodd-Frank Act Rulemaking: Derivatives" [http://www.sec.gov/spotlight/dodd-frank/derivatives.shtml, visited on 15.12.2012], the SEC Release 34-68071 (2012), the CFTC Rule (17.02.2012), the CFTC Rule (11.09.2012), the SEC Roadmap (2012) and the final rule SEC & CFTC Release 33-9338 (2012). The Dodd-Frank Act (2010) prohibits the regulation of swaps under insurance laws.

of clearable CDS exposures is uncertain. The Basel Committee on Banking Supervision (BCBS) and International Organization of Securities Commissions (IOSCO) only recently developed consistent global standards on margin requirements for non-centrally cleared swaps as a basis for the rules of the G-20 member states. These standards are expected to reduce global contagion and spillover effects by guaranteeing that sufficient collateral is provided to offset losses caused by the default of a (derivative's) counterparty. All financial firms and systemically important non-financial entities ("covered entities") that use uncleared derivatives must exchange the initial margin (reflecting the potential future exposure) and variation margin (expressing current exposure) equivalent to the counterparty risks posed by such transactions. Additionally, only collateral that is high-quality and liquid can be provided to meet the above requirements (BCBS & IOSCO (2013)).[60]

2.1.2.3 Derivatives and Other Relevant Rules on a Fund's Liquidity, Name, and Disclosure

Illiquid assets

Funds are required to keep at least 85% of their assets in liquid securities. Therefore, they have to adequately account for derivatives when verifying that less than 15% of their net assets are invested in illiquid assets, i.e., securities that cannot be disposed of within seven days under usual business conditions at approximately the amount at which the fund values them. The SEC liquidity requirements of derivative instruments are dependent on relevant market conditions. Custom-made derivatives are more likely to be illiquid. The valuation of derivatives is typically carried out at market or fair values; at the same time, there is no clear distinction between different degrees of liquidity given by the law. Consequently, many funds incorporate clauses into their contracts that guarantee seven-day termination rights in their favor.[61] Due to the short-term orientation, using the market values of derivatives can be justified under this rule.[62]

Fund Name Regulation

Rule 35(d) of the ICA prohibits funds from using names that are deceptive and misleading. When determining their name, funds have to take into account investor perceptions and manage their assets accordingly. If a name suggests that the fund invests in a particular type of security, then at least 80% of the assets have to be invested in positions that comply with the name (fund name regulation in the following). Under this rule, securities including derivatives are considered at their

[60] Information in this paragraph refers to "Final Margin Framework for Uncleared Derivatives Released by Basel Committee and IOSCO Board Excludes Nonfinancial End-users from Requirements to Post Margin", November 11, 2013, [http://www.velaw.com/resources/FinalMarginFrameworkUnclearedDerivativesBaselCommitteeIOSCOBoard.aspx, visited on 20.12.2013] and BCBS & IOSCO (2013).

[61] For more details, see the SEC Staff report (1994), p. 20-22, the CFRS Derivatives and Leverage Report (2010), p. 36-37, and Form N-1A [http://www.sec.gov/about/forms/formn-1a.pdf, visited on 29.03.2012].

[62] However, as mentioned in the introduction, experience from the financial crisis 2007-2009 has shown that quickly increasing obligations from CDS holdings can cause the illiquidity of many market participants.

market values. The CFRS Derivatives and Leverage Report (2010) recommends that the reference asset of a derivative is considered as an indicator of a fund's investment focus and the market values of derivatives used to prove compliance with rule 35d-1 of the ICA. Up to 20% of the assets can be held in other investments, i.e., cash or cash equivalents that are suitable to meet redemption requests. Descriptions like "short-term", "intermediate", and "long-term" are consistent with the fund name when the fund portfolio has a dollar-weighted average maturity of: at most 3 years (short-term); more than 3 years, but less than 10 years (intermediate); and more than 10 years (long-term). The 80% rule does not apply to fund names that contain the terms "growth" and "value" since they indicate the investment strategy as opposed to the type of investments.[63] Shareholders must be notified about every change in investment policy 60 days prior to the change.

Disclosure

U.S. funds are required to inform investors about their investment objectives and policies, investment strategies, and risks in statements of incorporation (Form N-1A), prospectuses, Statements of Additional Information (SAIs), and periodic reports. The statement of incorporation contains information about a fund's intention to use derivatives, while the prospectus comprises information about a fund's current use of derivatives and/or its intention to use derivatives. The SAI includes detailed descriptions of a fund's (or a fund family's) derivative handling, while the report comments describe the derivative strategies applied by a fund together with a brief overview of derivative handling. New FASB rules regarding financial information related to credit derivatives, which were introduced over the course of 2009, create uniformity in report comments, thereby allowing for better fund-to-fund comparisons. Funds are now required to state the nature and the terms of credit derivatives, give reasons for entering into those instruments, specify events that require the seller to perform under a contract, and describe the current status of the payment/performance risk with regard to the contract. Moreover, funds have to post information about the highest potential amount that the fund could be required to make as a contract seller, the market (or fair) value of the contract, and the nature of any recourse provisions/assets held either as collateral or by third parties. Before this change, information concerning derivatives was arranged arbitrarily throughout the financial statements of funds, causing large variation in the details provided about derivatives contracts.[64]

[63] For more detailed information about fund name regulation, please refer to 35(d) ICA in connection with the SEC Release 24828 (2001). Fulfilling the 80% requirement does not automatically mean that the name cannot be materially deceptive and misleading. See the SEC Release 24828 (2001).

[64] Information contained in this paragraph refers to the ICA (1940), sec. 8(b), 30(e), the Securities Act (1993), the SEC Letter to the GCotICI (2010), the CFRS Derivatives and Leverage Report (2010), p. 41, and FASB ASC 815-10 (2009), Form N-SAR [http://www.sec.gov/about/forms/formn-sar.pdf, visited on 20.12.2013].

2.2 Regulation of Mutual Funds in Germany

The following presents an overview of mutual fund regulation for UCITS-compliant funds ("UCITS funds")[65], with a focus on investment strategies, the use of derivatives and leverage, legal disclosure requirements, as well as recent changes.

2.2.1 The Transition from the Investment Act (2004) to the Capital Investment Law (2013)

In 2004, the German mutual fund industry was at a juncture marked by the legal endorsement of hedge funds and a major extension of the scope of possible investment strategies pursued by other types of mutual funds, including the wide use of derivative instruments as a part of the investment strategy. Moreover, new regulation introduced a simplified prospectus, specific expense disclosure rules, and tax-neutral mergers of mutual funds. The liberalization of the European mutual fund industry was driven by an adaptation of the overhauled European UCITS directive 85/611/EEC[66] on the national level by member states in the years following 2001.

In order to promote the competitiveness of Germany as an investment location, the Investment Modernization Act came into effect on January 1, 2004. The Act consisted of two parts, the supervisory Investment Act ("IA")/Investmentgesetz ("InvG") and the Investment Tax Act ("ITA")/Investmentsteuergesetz ("InvStG"). It replaced the old regulation of the German Capital Investment Companies Act ("GCICA")/Gesetz für Kapitalanlagegesellschaften ("KAGG") from 1957 and the Foreign Investment Funds Act ("FIFA")/Auslandinvestmentgesetz ("AIG"), which were the relevant regulations for German and foreign mutual funds in Germany, respectively. In the period from 2004 to mid-2011, the IA/InvG underwent two major reforms before it was finally replaced by the Capital Investment Law (CIL)/Kapitalanlagegesetzbuch (KAGB) in 2013. **Appendix B** provides an overview of the major changes and lists the statutory orders, which further specify the content of the legal changes, used for the discussion of financial derivatives regulation later in this document.

The Investment Amendment Act ("IAA")/Investmentänderungsgesetz ("InvÄndG") and the UCITS-IV-Implementation-Act ("UCITS-IV-IA")/OGAW-IV-Umsetzungsgesetz ("OGAW-IV-UmsG") came into

[65] However, the term "UCITS" commonly refers to "the investment company (if the UCITS is self-managed), and the management company, if the UCITS is not self-managed, or if the UCITS is set up in a contractual or unit trust form." CESR Guidelines (2010), p. 4.

[66] Council Directive 85/611/EEC of 20 December 1985 on the coordination of laws, regulations and administrative provisions relating to undertakings for collective investment in transferable securities (UCITS), OJ L 375, 31.12.1985, p. 3-18. The directive had undergone substantial changes from two amending directives by this time. The previous sentences in this paragraph refer to the BVI Jahresbericht 2004, S. 41, and Vollbrecht (2003), p. 1-2.

effect on December 28, 2007 and July 1, 2011, respectively.[67] The focus of the IAA/InvÄndG was on the further deregulation, extension of scope (e.g., PPP or microfinance investment funds, among other investment funds), and the elimination of competitive disadvantages of open-end real estate funds. The UCITS-IV/OGAW-IV reform was concerned with the implementation of a powerful set of regulatory and supervisory conditions in order to let investment companies and single investors benefit equally from the advantages of a common market. The benefits of the reform included the simplification of cross-border notification procedures (and the introduction of a complete EU-Passport[68]), mergers, and the pooling of financial assets through the introduction of master-feeder structures. Especially noteworthy was the EU-wide harmonization of regulations concerning the supervision of management companies and investment funds and mutual recognition by the relevant member state authorities.[69]

On the EU level, the European Market Infrastructure Regulation ("EMIR") and the Alternative Investment Fund Managers Directive ("AIFMD") entered into force on August 16, 2012 and July 21, 2011, respectively, but have not yet been fully implemented.[70] The European Securities and Markets Authority ("ESMA") is responsible for the consistent application of EU legislation in all member states and plays a special role in the implementation of the new OTC derivatives rules. ESMA is responsible for the authorization and monitoring of CCPs and trade repositories. Although central clearing specifically addresses counterparty credit risk, not all OTC derivative contracts are considered suitable for mandatory CCP clearing. For this reason, the rules further require ESMA to establish, maintain, and keep an updated public register on their website. The AIFMD fulfills the G-20 commitments with regard to a wide range of (alternative) investment funds that were not regulated at European level by the UCITS Directive 2009/65/EC. In addition to hedge and private equity funds, real estate funds and various types of institutional funds comprise alternative investment funds ("AIFs"). After implementing AIFMD into national law, all investment funds in the EU will be categorized either as UCITS or AIFs. In Germany, both the rules of the UCITS Directive 2009/65/EC and the AIFMD are combined into a new Capital Investment Law (CIL)/Kapitalanlagegesetzbuch (KAGB), which came into force on July 22, 2013. Since all important German statutory orders, legal interpretations, and tax rules still refer to the old IA/InvG, I will sometimes refer to the IA/InvG. **Appendix D** translates the relevant laws of the old IA/InvG to the new CIL/KAGB.

[67] The end of 2007 amendment was a full implementation of the consolidated UCITS Directive (85/611/EEC)/OGAW-Richtlinie (RL) (85/611/EWG) and the Implementing Directive (2007/16/EC)/Durchführungs-RL (2007/16/EG), whereas by the mid-2011 amendment the UCITS Directive (2009/65/EC)/OGAW-RL (2009/65/EG) was implemented.

[68] The extension of the EU-Passport to a complete EU-Passport for management companies enables managers to manage mutual funds located outside their country of residence in the EU.

[69] Regarding information contained in this paragraph, please refer to the Beschlussempfehlung und Bericht des Finanzausschusses, Deutscher Bundestag, Drucksache 16/6874 vom 25.10.2007, p. 230, UCITS-IV-Implementation-Act/OGAW-IV-Umsetzungsgesetz (Entwurf vom 31.12.2010), p. 1, 85, and the BVI Jahresbericht 2008, p. 50.

[70] To the information contained in this paragraph, see EMIR (2012) and AIFMD (2011).

2.2.2 Restrictions on the General Investment, Leverage, and Issuer-Oriented Investments of Funds in Germany

The legal definitions of mutual fund types, which were valid until 2003, were subsumed under the umbrella term of investment fund ("Sondervermögen"), which continues to exist under prevalent regulation. According to § 2 IA/InvG [2004], investment funds are defined as open-end investment funds ("Publikums-Sondervermögen") managed by an investment management company and must adhere to the standards of the UCITS directive (85/611/EEC). Although UCITS-compliant funds are the most common type of mutual fund, other special investment funds are also available to the public and subsumed under the term AIF since mid-2013.

In order to use the legal mutual fund category for naming and marketing purposes, the law requires mutual funds to invest at least 51% of their assets in the respective category. Under this rule, securities including derivatives are considered at their market values. For example, a UCITS fund that is primarily (at least 51%) invested in fixed-rate securities should use the term "Bonds" or "Renten", while a fund that is primarily invested in shares should use the term "Equity" or "Aktien".[71]

Since 2004, UCITS funds have been able to invest in an extended set of assets: securities (§ 193 CIL/KAGB), money market instruments (§ 194 CIL/KAGB), bank deposits (§ 195 CIL/KAGB), investment fund shares (§ 196 CIL/KAGB), derivatives (§ 197 CIL/KAGB), and other investment vehicles (§ 198 CIL/KAGB). The acquisition of precious metals or certificates for precious metals are explicitly prohibited by § 192 of the CIL/KAGB. Moreover, regulations concerning borrowing (§ 199 CIL/KAGB), securities borrowing and collateral (§ 200 CIL/KAGB), repurchase agreements (§ 203 CIL/KAGB), and short sales (§ 205 CIL/KAGB) have to be obeyed. Of high importance are also the legal issuer and investment limits (§§ 206–211 CIL/KAGB), which serve the purpose of reducing credit and market risk. A selection is summarized in **Table 2**.

Table 2: Issuer and investment limits for UCITS funds

§ CIL/KAGB	Issuer and Investment Limits (§§ 206–211 CIL/KAGB)	% of fund assets
§ 206 (1)	Securities and money market instruments of the same issuer (borrower)	5%/10% (40% cumulatively)
§ 206 (5)	Securities, money market instruments, bank deposits, and the offset amount for counterparty credit risk from OTC derivatives of the same institution	20% cumulatively

[71] See the BaFin Directive on Fund Categories/BaFin-Richtlinie zur Festlegung von Fondskategorien (2004) & (2011).

§ CIL/KAGB	Issuer and Investment Limits (§§ 206–211 CIL/KAGB)	% of fund assets
§ 206 (4)	Bank deposits with one bank	20%
§ 199	Short-term loans (< 1 year)	10%
§ 205	Prohibition of short sales has to be obeyed for all investment strategies. Since July 1, 2011, this is no longer applicable to derivatives.	
§ 210	The sum of the notional amounts of bonds and money market instruments of the same issuer must not exceed 10% of the total notional amounts of bonds and money market instruments issued by this issuer.	10% of the issuer's o/s total notional amounts
§ 210	Voting/Non-voting shares of the same issuer may be purchased for a UCITS fund only insofar as their share in the total amount of voting/non-voting shares of the same issuer does not exceed 10%.	10% of an issuer's o/s voting or non-voting stock
§ 197	Derivatives can be included up to a two times increase of a fund's potential market risk. Associated issuer and counterparty risks have to be incorporated into the calculation of the above issuer limits.	Max. doubling of a fund's potential market risk

Paragraphs 206-211 of the CIL/KAGB establish a ceiling on the amount mutual funds are permitted to invest in certain asset types. In general, the law aims at distributing risk among a broad basis of issuers, securities, and real estate. According to § 206 (1) CIL/KAGB, no more than 5% of a fund's assets may be invested in securities and money market instruments of the same issuer. This issuer limit may be elevated to 10% of the asset value of a UCITS fund only if it is explicitly stated in the terms of the contract and the sum of such exceptions does not exceed 40% of the fund's value (5%/10%/40%-issuer rule). Furthermore, § 206 (4) CIL/KAGB imposes another volume restriction on investments in bank deposits with the same credit institute, which may not exceed 20% of the UCITS fund assets. Prior to 2004, sufficient deposit insurance did not warrant such a restriction. Since 2004, the offset amount for counterparty credit risk from OTC derivatives of the same institution is limited to no more than 5% of a fund's assets or 10% in the case of credit institutions.[72] A fund's cumulative investment in securities, money market instruments, bank deposits, together with the offset amount for counterparty credit risk of the same institution, are restricted to a maximum of 20% of a fund's assets (§ 206 (5) CIL/KAGB), with the aforementioned issuer-related ceilings remaining in place.

[72] See § 22 Derivative Order/DerivateV (2004), § 22 Derivative Order/DerivateV (2011) and the CESR Guidelines (2010).

Short-term borrowing is limited to 10% of a fund's assets if provided for in the terms of the contract and if the credit terms are in line with common practices (§ 199 CIL/KAGB). Short-term loans have a maturity equal to or less than 1 year and serve either for investment purposes or to bridge a liquidity gap, but should not be part of long-term investment strategies.[73] Moreover, short sales are prohibited by § 205 CIL/KAGB (derivatives are excluded from this prohibition since mid-2011). The use of derivatives may, at most, double the potential market risk of a mutual fund (§ 197 CIL/KAGB) – i.e., the potential market risk from derivatives must be lower than a fund's TNA.[74] Investment companies have to assess their potential market risk by using an appropriate risk model and check it at least on a daily basis (CESR Guidelines (2010)). Since 2004, funds are allowed to use either the commitment approach (simplified method) or the VaR approach (advanced method) for risk measurement, depending on the types of derivatives used. The CESR Guidelines (2010) clarify that the commitment approach relates to the incremental exposure/leverage, whereas the VaR approach concentrates primarily on market risk.[75] Issuer and counterparty risks associated with derivatives have to be incorporated into the aforementioned calculations of issuer limits and will be discussed later in the text.

Since 2004, generally all kinds of derivative instruments may be purchased, including credit derivatives (§ 51 (1) IA/InvG [2004]). Furthermore, these derivatives may be used for hedging and investment purposes to a much larger extent than before.[76] Prior to 2004, a legal catalogue existed for all legally permitted derivatives. In Germany, securities funds („Wertpapier-Sondervermögen") were initially (starting in 1990) allowed to use derivatives – particularly options and futures based on equity indices, interest rates, or currencies. Funds were allowed to sell futures contracts for hedging purposes (if they keep the referenced underlying positions in their portfolios or if they, in the case of futures on currencies, face equal underlying risks in their portfolio). Until 1998, the exercise prices of purchased or sold options and the value of futures contracts could each reach up to 20% of a fund's TNA (however, funds could purchase interest rate futures contracts for non-hedging purposes if they complied with the 20% of TNA limit on the value of all futures contracts). From 1998 to 2004, funds in Germany could use options, futures/forwards, options on futures (based on securities, accepted indices, interest rates or currencies) and swaps (total return swaps, currency and interest rate swaps). Funds that held swaps were required to hold the respective underlying positions in their portfolios,

[73] See the BaFin-Questions on Leverage/BaFin-Fragenkatalog zur Kreditaufnahme (2009).

[74] Under the commitment approach (simplified method), one can increase the potential market risk of a fund by using derivatives by 100% of its TNA, i.e., increase leverage to 200% (§ 51 (2) IA/InvG [2004]). See Vollbrecht (2003), p. 4.

[75] For details regarding the application of the simplified and advanced method provided also later in the text, please refer to the following BaFin Explanation (2009) on the Derivative Order (2004)/BaFin-Erläuterung (2009) zu den §§ 6 – 17 DerivateV (2004) and BaFin Explanation (2011) on the Derivative Order (2011)/BaFin-Erläuterung (2011) zu den §§ 6 – 17c DerivateV (2011), respectively.

[76] 2004 was the first year were pure derivative funds could be launched in Germany. See the BVI Jahresbericht 2004, p. 43-44. To the following sentences of this paragraph compare §§ 8d-8f GCICA/KAGG [1990] and §§ 8d-8f GCICA/KAGG [1998].

which was otherwise only required if funds were selling derivatives or their underlying positions (for any purposes). Funds buying or selling currency futures (or options on them) could do so only if they hedged the risks existing in their portfolios. Until 2004, the market value of a fund's securities including futures contracts (of contracts selling the underlying for non-hedging purposes and those buying the underlying) could be, at most, equal to their net assets.

Under the new regulation, restrictions are placed on permissible underlying assets; hence, derivatives might be based on the following underlying positions: securities, some investment fund shares, money market instruments, accredited financial indexes, interest and exchange rates (or currencies). The use of derivatives is regulated under § 197 CIL/KAGB in conjunction with the Derivative Order (2004)/DerivateV (2004) and Derivative Order (2011)/DerivateV (2011), with the latter referring to the old § 51 IA/InvG. Since 2004, the use of derivatives must not lead to an alteration of a fund's purpose, as stated in the prospectus and the terms of contract. Moreover, it must be attuned to the profile of a typical fund investor and obey the above investment regulations and contract terms.[77]

2.2.2.1 Derivative Use under the General Restriction of the Commitment Approach

The commitment approach is suited for funds that use simple derivatives, but it might also be used if the amount of complex derivatives in their portfolios is negligible (which is assumed whenever the highest potential loss arising out of these derivatives lies below 1% of a fund's TNA). The commitment approach is mainly focused on market values of the underlying positions of derivatives. Under this method, all derivatives are transformed into the value of their underlying positions and, unless categorized as a hedging instrument or part of another non-speculative strategy (and netted out),[78] their sum is compared to a fund's TNA. **Appendix C** contains selected items from the list of examples for calculating the commitment values of various derivatives, which are provided in the CESR Guidelines (2010).

Since 2004, funds applying the commitment approach are only allowed to use long single-name CDS for "hedging" purposes as defined by CESR Guidelines (2010). If funds use complex derivatives like short single-name CDS or multi-name CDS, they are, in general, required to use the more advanced VaR approaches for risk measurement because complex correlations are not adequately accounted

[77] The regulation presented in the main text is based on the BaFin Explanation (2009) on the Derivative Order (2004)/BaFin-Erläuterung (2009) zu DerivateV (2004), which took effect on January 1, 2009 and was renewed in the middle of 2011 (BaFin Explanation (2011) on the Derivative Order (2011)/BaFin-Erläuterung (2011) zu DerivateV (2011)).

[78] Irrespective of whether two derivatives, or a derivative in combination with a non-derivative security, are considered, netting requires the underlying positions to be the same, e.g., exactly the same bonds of an issuer. By contrast, "hedging" as defined by the CESR Guidelines (2010), allows for different references. Both netting and hedging require that no additional gains are simultaneously generated and the risk of a fund is reduced and the market risks of derivatives are offset.

for under the commitment approach. Nevertheless, even if funds use complex derivatives to a negligible extent, they still have to adequately specify the commitment values for these derivatives under the commitment approach (CESR Guidelines (2010)).

As stated before, only the commitment values from the speculative use of derivatives are compared to a fund's TNA. For CDS bought on single-name underlying positions, the commitment values equal the market values of the underlying reference assets, whereas for the CDS sold on single-name underlying positions, the larger of either the market values of the underlying reference assets or the notional amounts of the CDS are used as the commitment values. The commitment values of long CDS will not be considered for comparison with a fund's TNA if a fund is offsetting another position (with an underlying having the same notional amount, coupon, and maturity) or buying protection on a bond already included in the fund's portfolio (for "hedging" purposes as defined by CESR Guidelines (2010)). By contrast, the commitment values of long and short CDS used for speculative purposes will be compared to the 100% TNA threshold.[79] For example, the threshold is relevant to a fund buying CDS protection on a bond without having the underlying bond in the portfolio (naked long CDS[80]), or to a fund buying a bond and CDS protection on that bond to realize arbitrage gains, e.g., via "negative basis trades"[81] (according to CESR Guidelines (2010), arbitrage gains preclude the treatment as a "hedge"). However, in order to create leverage under this approach, CDS selling protection can only be used up to the point where its notional values reach 1% of a fund's TNA.

2.2.2.2 Derivative Use under the General Restriction of the VaR Approaches

Funds using more than a negligible amount of complex derivatives or complex structures (where the commitment approach cannot be applied) are required to use the VaR approach to measure the increase in potential market risk due to derivative use. The VaR calculation might rely on historical simulation, Monte-Carlo simulation, or variance-covariance analysis – additional backtesting procedures and stress tests should be carried out to check the accuracy and quality of the VaR model as well as predict extreme-event outcomes. Between 2004 and mid-2011, the VaR (determined at the 99% confidence level for a 10-business day holding period using parameters from the previous year)

[79] Buying CDS on an underlying position that is highly correlated with a bond in the portfolio could be an additional way to hedge against a value loss of the bond (that would be considered as a "hedge", if the conditions specified in the CESR Guidelines (2010) were met). In case CDS selling protection are used in combination with short-term (3 month) government securities to synthesize bond positions, their commitment values would not be added to be compared to the 100% TNA threshold under the commitment approach.

[80] Between 2004 and mid-2011, the general short sale prohibition was also applicable on derivatives and guaranteed that, in the case of physically settled derivatives, the underlying positions were within the portfolio at contract initiation. E.g., buying protection via CDS for a physical settlement required holding the underlying of the CDS in the portfolio at contract initiation. See § 4 Derivative Order/DerivateV (2011).

[81] See Oehmke and Zawadowski (2013) and "Get Positive Results With Negative Basis Trades", September 23, 2011, [http://www.investopedia.com/articles/trading/08/negative-basis-trades.asp#axzz2Io8W8UVf, visited on 15.12.2012].

of a UCITS fund, including the different derivative constructs contained therein, was compared to the VaR of an appropriate, derivative-free, benchmark fund. The ratio of these two measures was not allowed to be larger than two (following the definitions provided by the regulation, this is called the "relative" VaR approach). As a consequence, funds using the relative VaR approach might have leverage higher than 100% of TNA because the approach is primarily restricting the increase in market risk under the assumption of normal market conditions. That is why funds using VaR have to further disclose the expected and potential leverage effect measured as the sum of the notional amounts of derivatives (without netting positions) in their prospectuses and annual reports. For example, the potential leverage from sold CDS (and eventually also from bought CDS that are in a fund's portfolio, which are then treated as if generating leverage) would be accounted for by the sum of notional values which could be higher than a fund's TNA. Interestingly, this is not meant to impose an additional limit on leverage; however, funds are required to control for the leverage effect in the framework of their risk management systems based on self-developed leverage measures.[82]

Since mid-2011, funds are able to calculate either an "absolute" VaR or a "relative" VaR; both determined at the 99% confidence level for a 20-business day holding period using parameters from the previous year. The new VaR measure is subject to an "absolute" limit of 20% of a fund's TNA. Starting July 1, 2011, rules in the Derivative Order/DerivateV (2011), §§ 28a to 28c, regulate the disclosure and declaration of certain information concerning derivative instruments. First, a fund's prospectus must disclose the method used for calculating the potential market risk generated by derivatives as well as the expected and potential leverage effect in a short and comprehensive manner. Since mid-2011, the annual report not only has to include the methods used for calculating the potential market risk, but also the risk model and the underlying model parameters. Additionally, investment companies have to transmit reports about the kinds and purposes of their derivatives to the BaFin on a regular basis (at least once a year). The purposes of derivative use could be either to hedge, gain risk exposure, or to implement selected investment strategies. Moreover, investment companies have to file declarations on derivatives and their commitment values at the end of the reporting period.

Furthermore, since mid-2011, the CESR Guidelines (2010) and the Derivative Order/DerivateV (2011) oblige EU/German funds to hold enough financial assets or/and liquid funds (including cash) to be able to meet all future obligations and payments from financial derivative instruments.[83] For cash

[82] Regarding information contained in this and the next two paragraphs, please refer to the CESR Guidelines (2010), p. 29-36 and the following BaFin Explanations on the respective Derivative Orders: BaFin-Erläuterung (2009) zu § 8 DerivateV (2004) and BaFin-Erläuterung (2011) zu den §§ 8-8a DerivateV (2011).

[83] As opposed to U.S. funds, which are generally allowed to engage in short selling as long as they comply with the coverage requirement for derivatives, German funds are prohibited to short sell. This new coverage requirement was implemented because the prohibition of short selling derivatives was abolished in mid-2011 (however, it contained many exceptions

settled derivatives, the fund has to hold sufficient liquid funds. For physically settled derivates, the fund has to have either the underlying position or a sufficient amount of liquid funds to buy this position (if the underlying asset is highly liquid and can be purchased on the market at any time). However, it is unclear whether these rules will be more effective than their U.S. counterparts as assets for coverage remain unspecified and funds can determine for themselves the method by which they set the coverage level for contracts with cash settlement (CESR Guidelines (2010)).

Under the current regulation, funds that apply the VaR approach are able to chose which value they use (relative VaR together with the associated benchmark fund or absolute VaR) and how to calculate the value – e.g, by relying on historical simulation, Monte-Carlo simulation, or variance-covariance analysis. In addition to this flexibility, they are able to develop the leverage measure for risk management. Given this high level of flexibility, the potential leverage measure, which currently reflects the sum of the notional values of all derivatives, could be redefined to make the disclosed potential leverage more informative for investors and comparable across funds. For instance, one could adjust the calculation of potential leverage to reflect the sum of the notional values of derivatives used for speculation only and require all funds to report it in a uniform manner. Overall, although the general restrictions differ in Germany compared to the U.S., German funds can theoretically increase their leverage via derivatives such as CDS selling protection beyond their TNA (if the VaR measures lie within the specified ranges) as well.

2.2.2.3 The Treatment of Derivatives under German/EU Issuer-Oriented Rules

Whenever funds use derivatives they also have to check compliance with the issuer/counterparty rules that limit a fund's exposure to the credit risks of these issuers. For purposes of the issuer-oriented rules, they need to consider derivatives at their commitment values (CESR Guidelines (2010)). Funds applying a VaR approach have to use the commitment approach or determine the highest potential loss as a result of default by the issuer (if the commitment value cannot be calculated or is more conservative).[84] According to the 5%/10%/40%-issuer rule, a fund can invest 5% of its assets in the securities and money market instruments of one particular issuer. Further, this 5% threshold can be shifted to 10% if it is specified in the contract terms and such exceptions do not exceed 40% of a fund's TNA. For example, if a fund holds a bond XYZ, which trades at par (equal to 4% of its TNA), and sells protection on the same bond XYZ via CDS (with a notional amount of 1% that equals the commitment value) for replication, it will be exposed to the corporate issuer XYZ for 5% of

already before). See § 4 Derivative Order/DerivateV (2011). Additionally, in Germany/the EU, funds are prohibited to short sell sovereign bonds via CDS since July 2010. See "Klares Ja zum Leerverkäufe-Verbot", January 22, 2014, [http://www.tagesschau.de/wirtschaft/leerverkaeufe136.html, visited on 22.01.2014].

[84] See the CESR Guidelines (2010), p. 38.

TNA. In this example, the commitment approach accounts for the exposure to the CDS reference issuer consistently when compared to the valuation of bonds under this limit.

German regulation generally requires funds to account for derivative counterparty exposure when a central counterparty is not involved in the transaction and if the mark to market valuation and the margin offset of the derivative are not performed daily. In order to account for counterparty exposure, funds have to comply with the 20%-cumulative issuer rule that restricts a fund's investments in securities, money market instruments, bank deposits, together with the offset amount for counterparty credit risk of one financial institution (intermediary). On an individual securities level, the market value of the securities and money market instruments of one financial institution cannot be higher than 5% (10%) and the nominal value of a bank deposits cannot be higher than 20% of a fund's TNA. Further, the regulator limits a fund's exposure to the credit risk of the counterparties of OTC derivatives (the offset amount for counterparty credit risk measured by a derivative replacement value) to 5% of a fund's TNA (or 10% in case of credit institutions).[85] Between 2004 and mid-2011, the derivative counterparty exposure (called offset amount for counterparty credit risk) was measured as the sum of the positive derivative replacement values plus a safety margin. Since mid-2011, the derivative counterparty exposure is measured as the sum of the positive derivative replacement values plus the collateral provided to the counterparty. In addition, since 2004, the derivative counterparty exposure of a fund can be netted against the claim of the counterparty of the fund and the collateral provided by the counterparty under specific conditions.[86]

The highest level of issuer/counterparty exposure of 20% of TNA could be reached, for example, if a fund invests 10% of its TNA in asset-backed securities and bonds[87] of a bank ABC and simultaneously buys CDS from ABC for the protection of various references with a replacement value of 10% of TNA. Derivative replacement values could be approximated by market values (reflecting liquidation values at reporting date). Hence, the potential exposure to counterparties on a notional basis may, in fact, be multiple times higher than suggested by market values[88] and create a problem if economic conditions change quickly (as happened during the financial crisis of 2007-2009). However, global rules on centrally cleared and "uncleared" derivatives are expected to minimize fund counterparty exposure in the EU/Germany in the near future.

[85] See the CESR Guidelines (2010), p. 37-38.
[86] These conditions are further specified in § 22 of the Derivative Order (2004)/DerivateV (2004), § 22 of the Derivative Order (2011)/DerivateV (2011), and the CESR Guidelines (2010), p. 38. Alternatively, UCITS funds may disregard the counterparty risk on the condition that counterparties provide collateral, which is valued at market price (after considering appropriate discounts) and exceeds the exposure to risk at any given time. See the CESR Guidelines (2010), p. 37-38.
[87] Alternatively, the fund might create these securities by investing in Treasury securities and selling CDS protection on ABS or bonds of this institution with a notional value of 10% of its TNA that, if equal to the commitment value, would instead be considered under the 20%-cumulative issuer rule in Germany/the EU.
[88] See the SEC Concept Release on Derivatives (2011), p. 29, 53.

To summarize, all these issuer rules guarantee that funds place at most 5% to 10% of their TNA with one corporate issuer[89] and 20% with a single intermediary. In Germany, the general market risk/leverage restriction interacts with the issuer-oriented rules to a higher extent than observed in the U.S.

3 Similarities and Differences between Derivative and Leverage Regulation in the U.S. and Germany/the EU – An Overview and Some Recommendations

Both in the U.S. and Germany, funds have to comply with general leverage restrictions and issuer-oriented rules. The major differences between how U.S. and German funds account for derivatives under these rules are discussed below.

3.1 General Leverage Restrictions in the U.S. and Germany

Table 3 summarizes the general leverage restrictions in the U.S. and Germany. For more detailed information on the U.S. and German rules, please refer to sections **2.1.1** and **2.2.2**, respectively.

Table 3: General leverage restrictions in the U.S. and Germany

General leverage restrictions in the U.S.	General leverage restrictions in Germany
Bank borrowing is restricted by the 300% asset-coverage rule to 33% of a fund's net assets. However, temporary (< 60 days maturity) short-term loans of up to 5% of a fund's TNA are allowed.	Short-term loans (< 1 year maturity) of up to 10% of a fund's TNA are allowed for either investment purposes or to bridge a liquidity gap, but not as a part of a fund's long-term investment strategies.

[89] Rules limiting fund investments in securities issued by the German government or EU member states slightly differ, e.g., according to § 206 (2) CIL/KAGB, 35% of a fund's TNA can be invested in debt securities issued by the EU member states.

General leverage restrictions in the U.S.	General leverage restrictions in Germany
The level of potential obligations arising out of derivatives that generate third party obligations only is restricted to a fund's TNA by requiring sufficient coverage. This concerns e.g., futures and forwards, written options, short CDS (as opposed to purchased options or long CDS, which are not covered by this rule). This rule is also applicable to other securities-lending transactions e.g., short selling. In order to determine these potential obligations from long derivative positions, the SEC recommends using the purchase or exercise price of the contract (less the margin on deposit), and for short positions the market value of the security or the notional amount of the asset underlying a contract (e.g., a derivative). This is the traditional SEC viewpoint. Meanwhile, almost all of a fund's securities can be "earmarked" on a fund's books (alternatively, segregated with a custodian) and offsetting positions entered as coverage for this kind of "senior security transactions".	Derivatives may, at most, double the potential market risk of a fund. Typically the "relative" or "absolute" VaR approach is used to measure the increase in potential market risk. Following the definitions provided by regulation between 2004 and mid-2011, under the "relative" VaR approach, the relation of the VaR of the fund's portfolio to a VaR of an appropriate, derivative-free, benchmark fund is allowed to be at most two. From mid-2011, in addition to the relative VaR, funds are able to calculate an "absolute" VaR (both at the 99% confidence level for a 20-business day (previously 10) holding period using parameters from the previous year). The new VaR measure is subject to an "absolute" limit of 20% of the value of the fund. If funds use simple derivatives or negligible amounts of complex derivatives (with loss potential below 1% of a fund's TNA), the commitment approach can be applied, which restricts commitment values of derivatives used only for speculation (based on the market values of the underlying positions of derivatives) to a fund's TNA. Additionally, since mid-2011, UCITS funds have to hold sufficient liquid funds for cash settled derivatives and the underlying position, or sufficient liquid funds, for physically settled derivatives (if the underlying asset is highly liquid and can be purchased on the market at any time).

As presented in **Table 3,** the concept of "senior security" transactions and various coverage rules serve as excessive leverage/risk guardians at mutual funds in the U.S. Direct leverage in the form of bank borrowing is restricted by the 300% asset-coverage rule to 33% of a fund's net assets, while temporary (60 days maturity) short-term loans of up to 5% of TNA can be taken out without complying with any coverage rules. In contrast to the U.S., German funds are allowed to take out short-term loans, with a maximum maturity of 1 year, up to 10% of TNA for either investment purposes or to bridge a liquidity gap, but not as a part of long-term investment strategies. Independent from the limits on direct leverage, U.S. and German funds face separate rules restricting derivative use.

The U.S. law restricts the level of potential obligations arising only from derivatives that generate third party obligations (e.g., futures and forwards, written options, short CDS)[90] by requiring sufficient coverage to a fund's TNA. However, the SEC observes that funds commonly underestimate these

[90] A fund's TNA is the outcome of subtracting direct leverage from the total investments position.

obligations (the amount that needs to be covered), which might, in consequence, allow funds to further increase their derivative holdings. Additionally, the use of derivatives with a loss limited to the premium paid and an unlimited potential gain (e.g., purchased options, long CDS) is not restricted. Thus, the sum of the notional values of derivatives that either do or do not create third party obligations can be higher than a fund's TNA. In Germany, funds using derivatives face a cap on the potential market risk created by derivatives (as presented in **Table 3**), which must be quantified using the VaR approach.[91] Using a 99% confidence level for the VaR approach, the sum of the notional values of derivatives (or in the worst case, indirect leverage), can be extended beyond 100% of a fund's TNA. In addition, since mid-2011, German funds have to comply with coverage rules that are, in principle, comparable to U.S. coverage requirements. However, it is unclear whether these rules are more effective than their U.S. counterparts as assets for coverage remain unspecified and funds can determine for themselves the method by which they set the coverage level for contracts with cash settlements (CESR Guidelines (2010)). As in the U.S, these rules will not necessary prevent funds from taking on additional risk by using derivatives with a loss limited to the premium paid and unlimited gain potential. Although general restrictions are structured differently in the U.S. and Germany, they similarly allow funds to keep derivative holdings with notional amounts higher than a fund's TNA, and to build indirect leverage up to the size of a fund's TNA (or even higher). Consequently, the flexibility provided by regulation with respect to derivative use and leverage makes it possible for funds to default solely due to derivative investments.

Most of the coverage and risk measurement rules in the U.S. and Europe take into account potential losses in portfolio investments under the assumption of normal market conditions. The U.S. segregation approach, for example, allows funds to quantify potential obligations in a less conservative manner than originally allowed as well as classify volatile securities, which are highly volatile by nature, as collateral for derivatives in a fund's portfolio.[92] This could be a problem under adverse market conditions where all securities are highly positively correlated. When it comes to handling individual derivative types, it could be helpful to have a list issued by the supervisory authority that describes, in detail, how much risk (in terms of money) needs to be covered (as it is done in CESR Guidelines (2010)) and by which type of securities and assets. Similarly, the new EU coverage requirements do not clearly state the amount that needs to be covered and by which "liquid funds". Thus, it might be helpful to require funds to use relatively risk-free coverage that is high enough in value to account for all potential obligations, which is often not the case for market values of derivatives. Rather, notional amounts (e.g., sold CDS) or some figure in between (e.g., futures)

[91] Alternatively, the commitment values of derivatives used for speculation only are restricted to a fund's TNA, but this threshold is of secondary importance as funds using this approach are, by definition, supposed to use mainly simple derivatives like long CDS written on single-name references and/or negligible amounts of complex derivatives.
[92] See the SEC Staff No-Action Letter to MLAM (1996).

should be used. Furthermore, the European VaR approach directly assumes normal market conditions for evaluating the risk of portfolio loss for a particular investment company, even when portfolios include many complex derivatives (calculated using a 99% confidence level for a 20-business day holding period – formerly 10-business day holding period – and parameters from the previous year). The financial crisis of 2007–2009 demonstrates that investors and regulators have to consider states of the world that are far from normal. Additionally, if the applied risk management methods average out the extreme outcomes and funds only communicate these averages to the public, some investors might perceive the respective investment vehicles as nearly risk free and remain unaware that their investments could potentially disappear during a crisis. In fact, one could argue that there is only a limited need for risk control under normal circumstances and therefore require funds to report the expected shortfall given the occurrence of an unexpected event (Hull (2012)).

Germany's/the EU's decision to implement risk control mechanisms (the VaR approach and stress testing procedures) used in the banking industry for the mutual fund industry (in 2001 in the EU and 2004 in Germany) was driven by the belief that the rules successfully regulate banks. However, there are some doubts about the effectiveness of these rules (and of the stress testing mechanism applied, e.g., Acharya and Steffen (2013)) as some European banks that performed well under recent stress tests later needed assistance from the European Community. Currently, German/EU funds are required to report all parameters and methods used to determine the minimum, mean, and maximum VaR values. However, this information will not necessarily enable regulators, auditors, or other interested parties to replicate the results. One recommendation would be to prepare a separate highest potential obligations statement that shows the highest potential obligations from short selling and other securities-lending transactions, futures, forwards, foreign exchange contracts, credit default swaps, interest rate swaps, and total return swaps subdivided into long and short positions. By reading the statement of operations, one would then be able to identify the impact of the different financial instruments on a fund's TNA at a specific reporting date and, using the highest potential obligations statement, determine the highest potential obligations from individual portfolio positions. An additional table could distinguish between obligations that do not require coverage (because of hedging or other non-speculative investment strategies) and those that do (leverage/speculation). As funds have portfolio assets to cover all the potential obligations from investments and leverage, coverage positions should be grouped in the second part (e.g., into positions held in segregated accounts kept with third parties, underlying securities preserved as collateral on funds' books, etc.). Since FASB disclosure rules introduced during 2009 (FASB ASC 815-10 (2009)) already require U.S. funds to conservatively value potential future obligations from derivatives by type (and list the amount of collateral provided) for disclosure purposes, one could

arrange this information in an easily accessible table.[93] The proposed tables could help the public and the regulators to more precisely approximate the loss potential of a fund.

In order to prevent funds from significant losses during a crisis while also allowing funds to pursue (non-)speculative derivative strategies that benefit investors, regulators could restrict the leverage from speculative derivative strategies and bank borrowing to a reasonable level below 100% of a fund's assets, e.g., 50% in addition to (or instead of)[94] the existing rules. The extent to which the limits are utilized could be disclosed by funds in the prospectuses and periodic reports, while a highest potential obligations statement and a breakdown of coverage table (including the types of collateral) could be provided in periodic reports.[95] This information should be comparable across funds and accessible to the public and regulators.

3.2 The Treatment of Derivatives under Issuer-Oriented Rules in the U.S. and Germany

Table 4 summarizes the regulations concerning the treatment of derivatives under issuer-oriented rules in the U.S. and Germany that restrict a fund's investments in the securities of particular issuers. For more detailed information on the U.S. and German rules, please refer to sections **2.1.2** and **2.2.2.3**, respectively.

[93] The SEC Letter to the GCotICI (2010) shows that funds did not uniformly disclose derivatives information until 2010. Currently, the information on future potential obligations from individual derivatives (and collateral provided) is spread across the annual report – it can be found in the footnotes of the schedule of portfolio holdings or in the notes part under single derivative descriptions. For example, see the Vanguard bond fund reports issued from 2004-2010.

[94] An additional measure of notional values of derivatives used for non-speculative purposes could then be limited to e.g., a fund's net assets.

[95] Data availability is an additional issue in Germany: although funds have to disclose their annual and semi-annual reports in the „Online Bundesanzeiger", most of them cannot be found on this website. Structuring the website like the website of the SEC (filings section) could benefit investors, researchers, and regulators alike. For example, searching for the UIL S.A. Jahresbericht (30.09.2007) for the Investmentfonds UniEuroKapital Corporates A or the DWS S.A. Halbjahresbericht (30.06.2007) for the Investmentfonds DWS Euro-Corp Bonds does not provide results.

Table 4: The treatment of derivatives under issuer-oriented rules in the U.S. and Germany

Issuer-related rules in the U.S.	Issuer-related rules in Germany
Under the issuer-related rules in the U.S., derivatives are, in general, accounted for at market values to guarantee a fund's independence from a few issuers or counterparties.	Under the issuer-related rules in Germany, the exposure to the reference issuer of the derivative and to the counterparty has to be accounted for in order to protect a fund from issuer/counterparty credit risk. Commitment values, or the highest potential loss given the default of the issuer (if the commitment value cannot be determined or is more conservative), are used to value the exposure to the reference issuer of derivatives.
5%/75%-diversification requirement: A fund classified as diversified is not allowed to invest more than 5% of its TNA in securities of one particular issuer (and to keep more than 10% of the outstanding voting securities of this issuer) for 75% of its asset value. Under the diversification requirement, a fund's exposure to the reference issuer of derivatives (not necessary to the counterparty) has to be accounted for at market values.	**5%/10%/40%-issuer rule:** Under this rule, a UCITS fund is not allowed to invest more than 5% of its TNA in securities of one particular issuer. The contract terms may further specify that the 5% rule can be extended to 10% up to a maximum of 40% of a fund's TNA. The commitment value, or the highest potential loss given the default of an issuer, must be determined in order to quantify the exposure to the reference issuer.
Portfolio Concentration requirement: Concentration within an industry is assumed to take place whenever a fund invests more than 25% of its assets in an industry (with industry classifications determined by a fund). Under this requirement, funds must account for the exposure to the reference issuer of the derivative (not necessary to the counterparty). Funds are allowed to use market values or notional amounts to value derivatives. However, funds seem to calculate industry exposure to the reference issuers of derivatives most often using market values.	**20%-cumulative issuer rule:** This rule applies for financial institutions (intermediaries) that provide funds in Germany with securities, money market instruments, bank deposits and contracts creating counterparty exposure (including derivatives). On the individual securities level, investments in securities and money market instruments cannot be higher than 5% (10%) and bank deposits 20% of a fund's TNA. The derivative counterparty exposure, measured by derivative replacement values, may not exceed 5% of a fund's assets (or 10% for credit institutions).

Issuer-related rules in the U.S.	Issuer-related rules in Germany
5% Limit on Investing in Securities-Related Issuers: Under specific conditions of 12d3-1 of the ICA, funds are allowed to invest 5% of their TNA in securities provided by securities-related issuers, e.g., brokers, dealers, underwriters, or investment advisers with derivatives considered at market values. Under the conditions specified in 12d3-1 of the ICA, derivatives are perceived as debt securities and can be accounted for using the market or notional value of derivatives (however, the SEC observes that funds often use notional amounts to perform these calculations).	

The U.S. issuer limits focus on the current portfolio composition and on restricting a fund's exposure to the credit risk of various issuers. Hence, the treatment of derivatives, as indicated in **Table 4,** conceptually differs from the consideration of derivatives under general leverage restrictions ("senior securities" limitations). For purposes of the 5%/75%-diversification requirement, the same derivative valuation rules apply as for calculating a fund's TNA: The "market value" is applied for exchange-traded derivatives and the "fair value" for OTC derivatives. Additionally, under the portfolio concentration requirement, funds can choose to use the notional value of derivatives. Although the potential exposure attainable through derivatives consists of two parts (the reference issuer and counterparty risks), it remains unclear whether only the reference-issuer exposure or both the reference-issuer and counterparty exposures should be considered for the purposes of the diversification and portfolio concentration requirements (SEC Concept Release (2011)). In my view, regulators could rely on rules that capture the counterparty risk, such as the U.S. 5% limit on investing in securities-related issuers and global rules on mandatory central clearing.[96]

Under the issuer- and industry-related rules in the U.S., it would be useful to further distinguish between derivatives used for hedging purposes and those used for non-hedging purposes, and to only limit those that are used for non-hedging purposes (depending on the economic exposure created), as required by German/the EU regulation. Under German/EU regulation, if CDS buying or selling protections are used to hedge for existing portfolio positions, they do not need to be considered under the issuer limits that restrict reference-issuer exposure (insured securities are also not considered under these limits). As discussed in sections **2.1.2.1** and **2.2.2.3**, synthesized bonds created by using CDS selling protection should be accounted for at the market values of the underlying positions of CDS (or for simplification notional amounts) in order to be valued consistently

[96] CCPs face much higher capital requirements than the fund counterparties previously involved in derivative transactions.

with regular bonds under issuer-oriented rules (and not the market (fair) values of CDS).[97] Overall, since funds can circumvent the goal of the diversification and portfolio concentration rules by simply selling CDS and accounting for them at the market (fair) values, a concerted rule to value derivatives under both requirements should be designed. This rule should restrict exposure to a few individual issuers by accounting for the way derivatives are used in combination with other portfolio securities.

In Germany, derivatives are valued using either the commitment approach or the maximum loss given default of the issuer in order to ensure compliance with the issuer rules. In addition, these rules consider the way derivatives are used in combination with other portfolio securities.[98] For instance, if CDS selling protection on single-name securities are used to synthesize bonds, the larger of either the market value of the underlying position or the notional amount of the CDS is considered under the 5%/10%/40%-issuer rule. Assuming that the underlying bonds trade at par (below par), the market value of the underlying position (CDS notional value) is larger and better suits the purposes of the issuer-oriented rules in comparison to the CDS market (fair) values applicable under U.S. issuer limits.

In the U.S., funds account for derivative counterparty exposure if derivatives are not exchange-traded or otherwise centrally cleared and can be perceived as securities issued by securities-related issuers (e.g., brokers, dealers, underwriters, and advisers). If this is the case, derivatives (as well as the other securities of this particular issuer) are considered at their market value and can reach up to 5% of a fund's net assets under the 5% limit on investing in securities-related issuers. In Germany, funds account for counterparty exposure by relying on derivative replacement values under the 20% cumulative-issuer rule for financial institutions. Under this rule, the counterparty exposure cannot exceed 5% of a fund's assets (10% for credit institutions) if there isn't a central counterparty involved in the transaction and if the mark to market valuation as well as the margin offset of the derivative are not performed daily.[99] In the U.S., the market (fair) values of the "uncleared" CDS buying protection[100] (as well as other securities from the same issuer) are restricted to 5% of a fund's assets under the 5% limit on investing in securities-related issuers. In Germany, the replacement values of such CDS (approximately equal to market (fair) values) are restricted to 5% and might, together with other securities from the same issuer, reach up to 20% of a fund's assets, which is higher than the amount allowed under U.S. regulation. Nevertheless, these rules prevent funds from suffering high

[97] Alternatively, instead of using the market values of the underlying positions of derivatives, one could quantify the reference-issuer exposure on a notional value basis for simplicity reasons.

[98] Although the commitment values of derivatives used to synthesize securities are accounted for under German issuer-oriented rules, they would not be considered under the general leverage restriction based on the commitment approach.

[99] In the case of swaps, as for many other derivatives, counterparties of the contracts ask for posting collateral under the ISDA Master Agreement, CSA and the Dodd-Frank Act (2010) to support the credit exposure to the other counterparties. See the CFRS Derivatives and Leverage Report (2010), p. 37-38.

[100] Irrespective of whether long CDS "insure" the fund against the default of a bond or are used for speculation, the fund expects getting the notional amount (minus collateral) in the case of a bond default from the counterparty.

losses due to counterparty failure. This is in line with Helwege and Zhangs' (2013) findings that banks following similar diversification regulations only faced a small amount of counterparty exposure, which did not typically cause contagion around the 2007-2009 financial crisis.

Regarding a fund's exposure to OTC derivatives, it is important to note that during the financial crisis of 2007-2009, claims against AIG rose dramatically within a short period of time. In consequence, AIG (in its role as a CDS counterparty) was unable to offset margins and pay its obligations from CDS contracts before the intervention of the U.S. government (Brice (2011)). Similarly, Lehman Brothers, one of the main fund counterparties, suddenly defaulted because of risky investments in asset-backed securities and was unable to perform under existing CDS contracts (Hull (2012)). These events are why the G-20 countries agreed to oblige all derivatives to be centrally cleared by 2013/2014 and on the margin requirements (initial and variation margin) of the CCPs that directly restrict the counterparty exposure of funds. After full implementation of central clearing, there will be limited need to restrict counterparty exposure, unless the margin requirements and the capital requirements of the CCPs prove to be too low to prevent them from defaulting. The benefits can also be undermined due to the fragmentation of clearing services (Duffie and Zhu (2011))). Mandatory clearing started in the U.S. in March 2013, while in the EU it is anticipated to begin in the second half of 2014 at the earliest after the entry-into-force of the technical standards prepared by the ESMA.[101] Rules with regard to "uncleared" swaps were recently drafted, yet it remains unclear when (and in what final form) they will enter into force globally[102] and hence, whether they will fulfill their objective. The imperative question remains of whether or not rules implemented on a national level will be consistent enough, even after resolving all open issues, to avoid global regulatory arbitrage.

4 Conclusion

This study analyzes regulation with respect to leverage and derivative holdings of mutual funds in the U.S. and Germany/the EU by presenting the relevant rules and highlighting the main similarities and differences regarding the level of flexibility in both countries. In particular, the study discusses the application of existing regulation on CDS and the potential of mutual funds to use CDS for speculative purposes. The comparison reveals the following: First, funds in the U.S. and Germany face restrictions

[101] See "ESMA informs European Commission of its intention to ease certain frontloading requirements under EMIR", May 5, 2014, [http://www.esma.europa.eu/news/ESMA-informs-European-Commission-its-intention-ease-certain-frontloading-requirements-under-EMI?t=579&o=page%2FOTC-derivatives-and-clearing-obligation, visited on 01.07.2014].

[102] For the information contained in this paragraph, refer to the SEC Press Release (2012-251), "Timing tension – Europe clearing deadline set to slip", October 24, 2013, [http://www.risk.net/risk-magazine/feature/2302306/timing-tension-europe-clearing-deadline-set-to-slip, visited on 20.12.2013], "Final Margin Framework for Uncleared Derivatives Released by Basel Committee and IOSCO Board Excludes Nonfinancial End-users from Requirements to Post Margin", November 11, 2013, [http://www.velaw.com/resources/FinalMarginFrameworkUnclearedDerivativesBaselCommitteeIOSCOBoard.aspx, visited on 20.12.2013] and BCBS & IOSCO (2013).

on short-term bank borrowing of up to 33.3% and 10% of a fund's net assets, respectively. Second, independent from the limits on direct leverage, rules, which are structured differently in both countries, allow funds to extend leverage beyond their net assets by using derivatives. To avoid potentially high losses, it is advisable that regulators restrict direct and indirect leverage to a reasonable level below a fund's net asset value. Third, various issuer-oriented rules in the U.S. and Germany/the EU account differently for reference issuer and counterparty exposures from derivatives, with U.S. funds receiving higher discretion to undervalue the exposure to reference issuers. In order to guarantee a fund's independence from a few individual issuers and enhance investor protection with regard to undesirable changes in the asset allocations and risk profiles of funds, the respective exposures to issuers should be adequately accounted for. Regarding counterparty exposure from derivatives, funds are strictly regulated. In addition, they are expected to comply with strict global rules on mandatory central clearing for the majority of derivatives, and on "uncleared" derivatives in the near future. However, all other highlighted issues remain, for which the study proposes solutions that could benefit investors and regulators alike.

Overall, the flexibility provided by regulation with respect to derivatives and leverage makes it theoretically possible for funds to default solely due to their derivative investments. Furthermore, funds in the U.S. face higher discretion to increase the risks of their asset allocations via derivatives without being detected compared to funds in Germany/the EU. These results are highly relevant for the public and regulators in both countries.

Appendix A

This appendix shows the amount of securities and assets originally required by U.S. regulation for the coverage of selected derivatives and short selling as well as how regulation changes over time (until 2010).

Source	Operations & suggested coverage
SEC Staff No-Action Letter to Dryfus (1987), p. 1-2	"In Investment Company Act Rel. No. 7221 (June 9, 1972)('Release 7221'), the staff stated it would not object if a fund purchased or sold commodities or commodities contracts subject to certain restrictions, including 300-percent asset coverage of the contracts and other borrowings. (...) In Release 10666, the Commission discussed potential senior security and leveraging problems arising from certain own trading practices. The release sets forth means by which funds can eliminate these problems, and thereby avoid the restrictions on trading in commodities set forth in Release 7221, through the segregation of fund assets. (...) The staff has subsequently developed various segregation requirements for funds. To comply with these requirements, a fund with a long position in a futures or forward contract, or that sells a put option, must establish a segregated account (not with a futures commission merchant or broker) containing cash or certain liquid assets equal to the purchase price of the contract or the strike price of the put option (less any margin on deposit). (...) Segregation of assets is not required if a fund 'covers' a long position or the sale of a put option. For example, instead of segregating assets, a fund that has a long position in a futures or forward contract could purchase a put option on the same futures or forward contract with a strike price as high or higher than the price of the contract held by the fund. A fund that has sold a put option could sell short the instruments or currency underlying the put option at the same or higher price than the strike price of the put option. Similarly, the fund could purchase a put option, if the strike price of the purchased put option is the same or higher than the strike price of the put option sold by the fund."
SEC Staff No-Action Letter to Dryfus (1987), p. 1-2	"For short positions in futures or forward contracts, sales of call options, and short sales of securities, a fund may establish a segregated account (not with a futures commission merchant or broker) with cash or certain liquid assets that, when added to the amounts deposited with a futures commission merchant or a broker as margin, equal the market value of the instruments or currency underlying the futures or forward contracts, call options, and short sales (but are not less than the strike price of the call option or the market price at which the short position or short sales were established). (...) In addition, a fund that engages in short sales, short positions and sales of call options need not segregate fund assets if it "covers" these positions in the following ways. A fund selling a security short my own that security or hold a call option on that security with a strike price no higher than the price at which the security was sold. (...) A fund with a short position in a futures or forward contract may cover by owning the instruments or currency underlying the contract. A fund may also cover this position by holding a call option permitting the fund to purchase the same futures or forward contract at a price no higher than the price at which the short position was established."

Source	Operations & suggested coverage
SEC Staff No-Action Letter to Dryfus (1987), p. 3	"A fund selling a call option on a security or stock index may cover its position by holding the same security (or, in the case of a stock index, a portfolio of stocks substantially replicating the movement of the index) underlying the call option. A fund may also cover by holding a separate call option on the same security or stock index with a strike price no higher than the strike price of the call option sold by the fund. (...) A fund selling a call option on a futures or forward contract may cover by entering into a long position in the same contract at a price no higher than the strike price of the call option. Similarly, a fund may cover by owning the instruments or currency underlying the futures or forward contract. A fund could also cover this position by holding a separate call option permitting it to purchase the same futures or forward contract at a price no higher than the strike price of the call option sold by the fund."
SEC Staff No-Action Letter to RSIT (1995), p. 3	"We would not recommend that the Commission take enforcement action under Section 18(f) of the 1940 Act if a Fund that engages in short selling maintains in a segregated account on the books of its custodian an amount that, when combined with the amount of collateral deposited with the broker in connection with the short sale, equals the current market value of the security sold short."
SEC Staff No-Action Letter to MLAM (1996), p. 5	"Accordingly, we would not recommend that the Commission commence enforcement action under Section 18 of the Investment Company Act if a Fund covers its obligations that may otherwise be deemed to be senior securities by maintaining a segregated account on the books of its custodian, and includes in that segregated account cash or liquid securities (regardless of type) having an aggregate value, measured on a daily basis, at least equal to the amount of the covered obligations."
SEC Staff Letter from Lawrence A. Friend (1997), p. 3	“Typically, investment companies have designated securities to be segregated on the records of their custodians. The staff has been asked by registrants whether it would be consistent to segregate accounts on the fund's records. The staff has indicated that it would not object if assets segregated under Section 18 were designated solely on the fund's records and not designated on the fund's custodian's records.”
CFRS Derivatives and Leverage Report (2010), p. 14-15	"In December 2005, the SEC staff informally embraced a flexible approach for covering cash-settled futures and forwards. As in the case of interest rate swaps, in connection with the review and comment on fund registration statements, the staff acquiesced to the segregation of the net amount due on the contract, rather than the larger amount required to be segregated under the Dreyfus Letter. (...) For cash-settled futures and forwards, the SEC staff indicated that a fund may segregate assets equal to the net amount owed under the contract, as determined daily, less any margin that must be posted with a futures commission merchant. For purposes of the SEC staff’s position, a cash-settled contract is one in which no physical delivery is permitted on the settlement date; instead, the parties to the contract must settle with cash."

Appendix B

This appendix gives an overview of legal changes in Germany between 2004 and mid-2011.

Content of legal revision	Important statutory orders and legal interpretations
2004 Investment Modernization Act "IMA“ (Investmentmodernisierungsgesetz "InvMG“)	
• The Investment Act “IA” (Investmentgesetz “InvG”) and Investment Tax Act “ITA” (Investmentsteuergesetz “InvStG”) came into effect for all home and foreign mutual funds on January 1, 2004, while some parts of prior regulations were valid until February 13, 2007 • Extension of investment opportunities and investment limits, especially the use of derivatives as a part of the investment strategy • Hedge funds were first permitted	• Derivative Order/DerivateV (2004)
2007 Investment Amendment Act "IAA“ (Investmentänderungsgesetz "InvÄndG“)	
• Effective December 28, 2007; some parts of prior regulation valid until July 1, 2010 • Further extension of investment opportunities and removal of certain investment limits, in particular, legal introduction of infrastructure and other special investment funds, such as microfinance funds • Discontinuation of double supervision by Bundesanstalt für Finanzdienstleistungsaufsicht (“BaFin”) and Deutsche Bundesbank in favor of sole supervision by BaFin	• BaFin Explanation (2009) on Derivative Order (2004)/BaFin-Erläuterung (2009) zu DerivateV (2004)
2011 UCITS-IV-Implementation-Act "UCITS-IV-IA“ (OGAW-IV-Umsetzungsgesetz "OGAW-IV-UmsG“)	
• Effective July 1, 2011, some parts of prior regulation valid until December 31, 2012 • EU-wide harmonization of supervisory rules, simplification of cross-border notification procedures (complete EU-Passport) and mutual fund mergers (and enablement of asset poolings by introduction of master-feeder structures)	• Three statutory orders and three BaFin explanations replaced old interpretations: • BaFin-Explanation (2011) on Derivative Order (2011)/BaFin-Erläuterung (2011) zu DerivateV (2011), The minimum requirements for risk management of investment companies (2010) / Die Mindestanforderungen an das Risikomanagement von Investmentgesellschaften (InvMaRisk (2010)) and BaFin explanation on InvMaRisk (2010), and Ordinance specifying rules of conduct and organizational requirements for investment services enterprises / Investment-, Verhaltens- und Organisationsverordnung (“InvVerOV”) and BaFin explanation on InvVerOV (2011)

Appendix C

This appendix shows an excerpt from the CESR Guidelines (2010), p. 8-9 about the commitment values to account for derivative exposure of selected derivatives used under various rules by EU/German funds.

Derivatives	Commitment values
Interest Rate Future, Currency Future	Number of contracts * notional contract size
Equity (or Bond) Future	Number of contracts * notional contract size * market price of underlying equity share (or market price of the cheapest-to-deliver reference bond)
Index Futures	Number of contracts * notional contract size * index level
Plain Vanilla Bond Option	Notional contract value * market value of underlying reference bond * delta
Plain Vanilla Equity Option	Number of contracts * notional contract size * market value of underlying equity share * delta
Plain Vanilla Interest Rate Option	Notional contract value * delta
Plain Vanilla Currency Option	Notional contract value of currency leg(s) * delta
Plain Vanilla Index Options	Number of contracts * notional contract size * index level * delta
Plain Vanilla Options on Futures	Number of contracts * notional contract size * market value of underlying asset * delta
Plain Vanilla Swaptions	Reference swap commitment conversion amount (see below) * delta
Warrants and Rights	Number of shares/bonds * market value of underlying referenced instrument * delta
Plain Vanilla Fixed/Floating Rate Interest Rate and Inflation Swaps	Market value of underlying (the notional value of the fixed leg may also be applied)
Currency Swap, Cross currency Interest Rate Swaps	Notional value of currency leg(s)
Basic Total Return Swap	Underlying market value of reference asset(s)
Non-Basic Total Return Swap	Cumulative underlying market value of both legs of the TRS
Single Name Credit Default Swap	Protection Seller – The higher of the market value of the underlying reference asset or the notional value of the Credit Default Swap. Protection Buyer – Market value of the underlying reference asset
Contract for Differences	Number of shares/bonds * market value of underlying referenced instrument
Forward Rate Agreement (FX forward)	Notional value (notional value of currency leg(s))

Appendix D

This appendix shows the separate paragraphs of the Investment Act/Investmentgesetz (IA/InvG) limiting investments, in particular securities, between 2004 and mid-2011 and lists the new corresponding rules of the Capital Investment Law/Kapitalanlagegesetzbuch (CIL/KAGB), which took effect on July 22, 2013.

§ of the IA/InvG	§ of the CIL/KAGB
§ 47 IA/InvG	§ 193 CIL/KAGB
§ 48 IA/InvG	§ 194 CIL/KAGB
§ 49 IA/InvG	§ 195 CIL/KAGB
§ 50 IA/InvG	§ 196 CIL/KAGB
§ 51 IA/InvG	§ 197 CIL/KAGB
§ 52 IA/InvG	§ 198 CIL/KAGB
§ 53 IA/InvG	§ 199 CIL/KAGB
§ 54 IA/InvG	§ 200 CIL/KAGB
§ 57 IA/InvG	§ 203 CIL/KAGB
§ 59 IA/InvG	§ 205 CIL/KAGB
§ 60 IA/InvG	§ 206 CIL/KAGB
§ 61 IA/InvG	§ 207 CIL/KAGB
§ 62 IA/InvG	§ 208 CIL/KAGB
§ 63 IA/InvG	§ 209 CIL/KAGB
§ 64 IA/InvG	§ 210 CIL/KAGB
§ 65 IA/InvG	§ 211 CIL/KAGB

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Part 2

Loss Potential and Disclosures Related to Credit Derivatives – A Cross-Country Comparison of Corporate Bond Funds under U.S. and German Regulation

Loss Potential and Disclosures Related to Credit Derivatives – A Cross-Country Comparison of Corporate Bond Funds under U.S. and German Regulation

by Dominika Paula Gałkiewicz

Abstract

This study analyzes the loss potential arising from investments into CDS for a sample of large U.S. and German mutual funds. Further, it investigates whether the comments funds make on CDS use in periodic fund reports are consistent with the disclosed CDS holdings. For several funds in the U.S., the potential losses arising from selling CDS protection are almost as high as net assets, while in Germany, this potential can be even higher. Regarding the information funds provide to investors about their use of CDS, the results of the study suggest that comments on CDS contained in periodic reports are often unspecific and sometimes misleading. Thus, investors might have to analyze portfolio holdings in order to learn about the true investment behavior of funds. For instance, in Germany, funds that use more short than long CDS often state that they only use long CDS for hedging purposes. Based on the results, it seems advisable that regulators in both countries tighten rules restricting the speculative use of derivatives by funds to a reasonable level, as well as implement more standardized disclosure policies.

JEL-Classification: G11, G15, G23, G28

Key Words: Mutual funds, leverage, derivative, credit default swaps, disclosure

1 Introduction

Can funds default solely due to their investments in derivatives? How accurate is the information funds provide to investors about their derivative use? In recent years, highly regulated market participants, including mutual funds, were heavily exposed to risk via derivatives. The majority of corporate bond funds in the U.S. that sold more credit default swaps (CDS) protection than they bought suffered severe losses compared to funds that predominantly bought CDS protection during the 2007-2009 financial crisis (Adam and Guettler (2014)). The Oppenheimer Champion Income Fund nearly collapsed in 2008 because of speculative investments into CDS and faced lawsuits concerning inadequate disclosure.[1] These developments follow from the fact that CDS are not only used for hedging, but also for implementing risky investment strategies that potentially create either high returns or losses. For instance, whenever a fund sells protection via CDS, it effectively adds leverage to its portfolio, because it is exposed to the notional amount of the swaps beyond its total net assets.

This study analyzes the loss potential of CDS holdings at U.S. and German funds along with the CDS related disclosure under the regulation existing during the time period of the 2007-2009 financial crisis. The goal of this study is to determine whether investors in both countries should worry about funds potentially taking extensive risks via derivatives and misinforming the public about their investments. Although mutual funds are highly regulated in both countries, they can implement speculative strategies by selling CDS, which undermines the effectiveness of investor protection offered by regulation.[2] From the European side, this study focuses on mutual funds distributed in Germany as they follow EU-wide regulation[3] and have been allowed to use credit derivatives since 2004. In addition, mutual funds in Germany are obliged to list the cumulated amounts of individual securities sold within the period in annual and semi-annual reports. These data provide unique insights into fund activities within the period. On the contrary, U.S. funds only report the overall portfolio turnover rate.

The purpose of this study is threefold. First, I empirically analyze the level of CDS use and the potential for realizing losses via CDS for a sample of U.S. and German corporate bond funds under the

[1] See "Recovering Oppenheimer Champion Fund Losses" and "Oppenheimer Champion Income Fund Lawsuits" [http://www.oppenheimerfundfraud.com/id3.html, http://www.youhavealawyer.com/blog/2009/04/16/oppenheimer-champion-income-fund-lawsuits/, respectively, visited on 08.09.2012].

[2] Managers, especially those of poorly performing funds (but not exclusively), often face strong incentives to increase the riskiness of their funds as their salary (and position) depends on the development of a fund's assets. It is well documented that managers succeeding in fund tournaments and fund family tournaments attract more inflows from investors and support from a fund family (e.g., Brown, Harlow, and Starks (1996), Chevalier and Ellison (1997), Taylor (2003), Kempf and Ruenzi (2008), and Kempf, Ruenzi, and Thiele (2009)).

[3] German regulation is based on the UCITS Directive 85/611/EEC, which also applies to public investment funds in other EU countries.

regulation existing during the financial crisis. Second, based on period-end and within-period data, which are only available for German funds, I investigate to which extent end-of-period CDS holdings are representative of a fund's investment behavior during the period. Third, I examine the accuracy of the information funds provide to investors about their CDS policies.

Although many rules are related to the use of derivatives, funds have a high level of flexibility when designing their investment strategies under both U.S. and German regulation: According to Gałkiewicz (2014), U.S. and German funds might increase their derivative investments up to the point at which it is possible for them to default solely due to derivatives. Thus, losses generated by the Oppenheimer Champion Income Fund in 2008, which were largely due to its CDS positions and reached almost 80% of its value, were in accordance with the existing regulatory limits on derivative use.

Given the high regulatory flexibility, it is interesting to empirically investigate the actual CDS holdings and disclosures of mutual funds. I analyze the 30 largest U.S. and German corporate bond funds (as determined by total net asset value (TNA) in 2004) included in the CRSP and BVI databases as they have the widest investor base.[4] Annual and semi-annual U.S. filings are obtained from the SEC, while German reports are directly provided by the funds. From these reports, I collect data on the funds' net assets as well as the notional and market values of CDS.

The results show that between 2004 and 2010, the use of long and short CDS positions (buying and selling CDS protection) was extensive and increased over time for funds in both countries. However, German funds, which have been allowed to use CDS only since 2004, had significantly higher and more varying CDS positions (measured by CDS notional amounts as a fraction of a fund's TNA) than their U.S. counterparts, especially after EU regulation took full effect in Germany in 2007. As indicated by the negative CDS net notional amounts (long – short positions) at period end, both U.S. and German funds often took on more risk via CDS than they hedged. This was especially pronounced during the 2007-2009 financial crisis where the CDS market peaked (BIS Quartely Review (2004, 2013)). For example, the highest (unrealized) reported loss due to CDS at reporting date equaled -8.10% (-1.63%) of TNA for U.S. (German) funds during the crisis. This is substantial given that corporate bond funds generated returns between -2.82% and 2.97% during the same time period (Adam and Guettler (2014)). According to U.S. regulation, which measures the loss potential of selling CDS protection by the sum of notional amounts, potential losses reached up to 93.82% of TNA for U.S. funds (127.04% of TNA for German funds) during the crisis. Even if the potential losses are

[4] I thank Lehmann and Stehle (2013) for kindly providing me with the data on TNA for German funds.

measured more conservatively by negative CDS net notional amounts, they still reached up to 58.54% of TNA for U.S. funds (93.19% of TNA for German funds) during this time. This further implies that direct leverage restrictions, which limit bank borrowing to 10% and 33.3% of a fund's TNA in Germany/the EU and the U.S., respectively, can be circumvented. Funds can inflate overall leverage by using derivatives, such as CDS, to levels above the value of their net assets. Furthermore, even if the size of the CDS holdings of U.S. and German funds are in line with regulation, it remains unknown to which extent these holdings are used by funds for speculation. Evidence from this study shows that investors could, in the worst case, lose their entire investment due to a fund's exposure to CDS. Thus, it might be worthwhile to tighten rules restricting the speculative use of derivatives by funds to a reasonable level in both countries (which should be determined by the regulator in the best interest of the majority of mutual fund investors). The majority of U.S. and German funds, which keep levels of long and short CDS measured by notional amounts below 15% of their net assets, would not be affected by this change. Tighter rules could, however, prevent potentially high losses due to outliers in the mutual fund industry.[5] Additionally, future research should shed light on the determinants of within-country variations in derivative use and relate them to cross-country variations.

In their reports, German funds are obliged to list the cumulated amounts of individual securities sold within the last period (including derivatives). By analyzing within-period data for German funds, I find that the purchases and sales of CDS observable from one period-end to the other only explained a fraction (37.34%) of the average (or 32.72% of the median) of aggregate CDS purchases and sales implied by period-end and within-period data. Overall, the above evidence suggests that management undertakes many undetectable round-trip CDS trades (purchases followed by sales or the other way around) within a period. This is concerning given the fact that almost half of the observed cumulative amounts of CDS traded over the course of a period (either small amounts turned over frequently or large amounts turned over infrequently) were higher than a fund's average CDS holdings as implied by period-end data. Interestingly, some funds repeatedly traded CDS in the second half of the calendar year between 2007 and 2010. However, definite conclusions about speculation require information about the portfolio holdings of funds and a wider database.

Finally, I analyze the information funds provide to investors about their CDS use. The mandatory CDS related comments provided in the notes of U.S. fund reports were very comprehensive compared to the almost nonexistent, voluntary report comments of German funds. The comparison of comments in annual and semi-annual fund reports with CDS holdings reveals that all CDS strategies mentioned

[5] The new regulation of over-the-counter (OTC) derivatives implemented via the Dodd-Frank Act (2010) in the U.S., and AIFMD (2011) and EMIR (2012) in Germany address the potential for counterparty risk to arise through derivative use, which was already strictly regulated for mutual funds by various issuer-oriented rules (Gałkiewicz (2014)).

by U.S. funds in their reports were in line with actual CDS holdings positions. However, there were rarely concrete statements about a fund's CDS related strategies. For example, funds pursuing short CDS strategies for non-hedging purposes often only stated to use long and short CDS for a wide range of purposes. By contrast, German funds seldom commented on their credit derivative holdings. The rare voluntary comments were of general nature and often even misleading. For instance, funds using more short CDS than long CDS often stated to use long CDS for hedging purposes only. An optimal regulation should prevent investors from reading unspecific information.

My analysis reveals potential risks allowed by mutual fund regulation in the U.S. and Germany with respect to derivative transactions. In the U.S., the potential for realizing losses by selling CDS protection might become almost as high as a fund's TNA, while in Germany, it is sometimes even higher. Furthermore, this high level of flexibility to use CDS allows funds to circumvent the existing strict direct leverage regulation. Finally, I show that the comments funds make about their CDS policies are vague and thus, investors have to analyze portfolio holdings in order to learn about their real investment behavior. This is of significant importance to regulators and investors alike. Since (mostly unsophisticated) investors all around the world expect a high level of protection from regulation, investment and disclosure strategies pursued by mutual funds should be intensively monitored by regulators and stronger regulation should be considered.

A large body of literature focuses on the measurement and sources of mutual fund performance, which goes back to Sharpe (1966) and Jensen (1968). In the last two decades, this stream of literature was extended in the U.S. by the studies of Carhart (1997), Daniel, Grinblatt, Titman, and Wermers (1997), Wermers (2000), Chen, Hong, Huang, and Kubik (2004), Ingersoll, Spiegel, Goetzmann, and Welch (2007), Mamaysky, Spiegel, and Zhang (2008), Comer, Boney, and Kelly (2009), Chen, Ferson, and Peters (2010). Most prominent in Germany are the more recent studies of Kaserer and Pfau (1993), Scherer (1994), Kielkopf (1995), Steiner and Wittrock (1994), Reichling and Trautmann (1997), Griese and Kempf (2003), Stotz (2007), and Lehmann and Stehle (2013). Most of these studies show that, on average, mutual funds underperform the market.

This study relates to the emerging literature on the purpose and the extent of derivative use by mutual and hedge funds (e.g., Koski and Pontiff (1999), Johnson and Yu (2004), Almazan, Brown, Carlson, and Chapman (2004), Marin and Rangel (2006), Chen (2011), Aragon and Martin (2012), Cici and Palacios (2013), and Adam and Guettler (2014)). These studies compare the performance and risk characteristics of funds using derivatives with those of nonusers. Most of the mutual fund studies find sporadic evidence that the use of derivatives affects the performance and/or the risk of the

funds using them. For example, lower fund performance of derivative users compared to nonusers is reported for Canadian domestic equity funds (Johnson and Yu (2004)), for several categories of Spanish funds (Marin and Rangel (2006)), and for U.S. equity mutual funds writing put options (Cici and Palacios (2013)). A few authors (Mahieu and Xu (2007), Minton, Stulz, and Williamson (2009), Hirtle (2009) and Van Ofwegen, Verschoor, and Zwinkels (2012)) have studied the use of CDS by banks. Mahieu and Xu (2007) and Minton, Stulz, and Williamson (2009) presume that only a small fraction of loans are hedged by banks via CDS, while Van Ofwegen, Verschoor, and Zwinkels (2012) find higher insolvency risks at European financial institutions using credit derivatives. However, detailed information about the purpose of using derivatives is lacking as empirical observations and data availability are limited. This study contributes to this stream of literature by providing first evidence for the extent of CDS use by German corporate bond funds and analyzing the level of potential losses from CDS use for U.S. and German corporate bond funds.

I also add to the extensive amount of literature on corporate and financial firm disclosure. The nature of corporate disclosure is summarized in Healy and Palepu (2001) and Beyer, Cohen, Lys, and Walther (2010).[6] While much of the literature focuses on developing theoretical frameworks that explain observed patterns in corporate disclosure policies and providing tests for market efficiency hypotheses associated with the theory of asymmetric information, Healy and Palepu (2001) state that regulation may be necessary for reasons other than correcting an inefficient supply through the provision of information in a Pareto-optimal sense. Referring to studies by Leftwich (1980), Watts and Zimmerman (1986) and Beaver (1998), Healy and Palepu (2001) note that the protection of individual "unsophisticated" investors may as well provide an explanation for prevailing regulation levels. Furthermore, Healy and Palepu (2001) argue that this reasoning shifts the normative grounds for regulation from an efficiency point of view to a wealth redistribution perspective. Indeed, there is evidence that regulators are far more concerned about the latter aspect than financial theory might be willing to acknowledge. Various SEC publications (e.g., SEC Staff report (1994), and SEC Letter to the GCotICI (2010)) provide evidence of the importance of the derivative strategies and disclosure policies of mutual funds, especially after times of crisis. My study therefore contributes to this less explored area of disclosure research. In particular, my paper is similar to the more recent empirical literature on risk disclosure of public companies (e.g., Hodder, Koonce, and McAnally (2001), Kajueter and Winkler (2003), Beretta and Bozzolan (2004), Lajili and Zeghal (2005), Linsley and Shrives (2006), CFA Report (2011), and CFA Report (2013)), insurance companies (e.g., Hoering and Gruendl (2011), and Malafronte, Porzio, and Starita (2013)), and banks (e.g., Hodder (2002), Linsley and Shrives

[6] This stream of literature goes back to the seminal contributions of Jensen and Meckling (1976) and Myers and Majluf (1984), who emphasize the role of asymmetric information in a corporate finance context.

(2005), Perignon and Smith (2008), and Schlueter, Hartmann-Wendels, Weber, and Zander (2013)). This study shows that deficiencies in disclosure, which are observable for public companies and financial institutions, are also observable for U.S. and German corporate bond funds. To the best of my knowledge, there are no studies that analyze the investment and reporting behavior of German funds with regard to CDS use.

The rest of the paper proceeds as follows. Section 2 discusses CDS related strategies. Section 3 presents the objectives of the study based on U.S and German regulation of mutual fund leverage and derivative holdings. Section 4 presents the data and section 5 analyzes the CDS use and the information funds provide to investors about their CDS policies. Finally, section 6 concludes.

2 CDS Related Strategies

CDS are the main form of credit derivatives and can be viewed as default insurance on loans or bonds (Duffie (1999)). For protection, a buyer (seller) pays (receives) a premium until the time of the credit event, or the maturity date of the contract (whichever is first). If a defined credit event occurs, the buyer receives the insured notional amount of a bond from the seller (after subtracting the recovery value of the bond); if a triggering event does not take place, the buyer pays the premium until maturity. Due to the fact that selling CDS protection generates high implicit leverage (at low premiums), it is suitable to implement risky investment strategies, which might lead to significant losses. Funds buy and sell various types of CDS that can be classified as single-name CDS (CDS on individual corporate or sovereign bonds), and multi-name CDS (CDS indices, CDS on bond indices and asset-backed securities). Depending on the constellation, the following CDS strategies are classified either as hedging or investment strategies predetermined to gain additional exposure to credit risk.[7]

In the case of bought CDS (protection buyer, long position), one can distinguish between at least four strategies: First, buying CDS on a specific underlying bond without having the underlying bond in the portfolio (naked long CDS) is probably a bet on the deterioration of the creditworthiness of a company. This strategy is speculative in nature and exposes the fund to counterparty risk. Second, buying CDS on an underlying in a portfolio is probably a way to hedge against a value loss of the bond caused by its deteriorating credit quality.[8] Third, simultaneously buying a bond and CDS on the respective bond can be perceived as a way to exploit temporary spread differences in the CDS market and the bond market, which are due to mispricing or differing counterparty and liquidity risks. Buying

[7] See Adam und Guettler (2014).

[8] Buying CDS on an underlying position that is highly correlated with a bond in the portfolio would be an additional way to hedge against a value loss of the bond, while a high volatility in bought CDS positions could imply speculative strategies.

CDS at a lower spread than implied by the bond spread (CDS basis = CDS spread – bond spread) and assuming no default of the counterparty, would be a so-called "negative basis trade" or a way to realize arbitrage gains.[9] Fourth, buying CDS at low levels and selling them at high levels of credit risk premia (credit market timing) is a way to exploit interest rate changes over time.[10] In the case of corporate bond funds, one could have bought CDS before the financial crisis of 2007 to 2009 and sold them during the crisis for a gain. Alternatively, funds can buy or sell CDS to offset previously sold or bought CDS positions on exactly the same securities (with the same notional amount, coupon, and maturity) to close existing positions.

For the case of sold CDS (protection seller, short position), two additional strategies should be mentioned: First, selling CDS and investing the notional amount into Treasuries would synthesize a bond or index, e.g., to diversify the portfolio. Additionally, this investment strategy could be the only way, or a cheaper way, to acquire a specific bond depending on market conditions.[11] Second, a levered bond position is created by selling CDS without increasing Treasuries, which is significantly riskier than a regular, unlevered bond position (in addition to its total net assets, the fund is subject to investment exposure on the notional amount of the swaps). If the CDS underlying positions are different from the other holdings, gaining additional exposure could help diversify the portfolio. Nevertheless, this strategy is speculative in nature.

It is not possible to distinguish between the above mentioned CDS strategies in detail because aggregate CDS positions are examined without analyzing the CDS underlying positions and without matching them to the portfolio positions of individual funds. However, based on aggregate long and short CDS data at the fund level, it is possible to estimate whether CDS were largely used for hedging or for gaining exposure (e.g., Adam and Guettler (2014)). In the following, I distinguish between long and short CDS strategies applied for hedging or for non-hedging purposes whenever possible.

3 Mutual Fund Leverage and Derivative Regulation and the Objectives of the Study

According to Gałkiewicz (2014), funds in both countries can keep derivatives with a notional amount higher than the value of a fund's net assets. Thus, depending on the types of derivatives used, funds

[9] See Oehmke and Zawadowski (2013) and "Get Positive Results With Negative Basis Trades" [http://www.investopedia.com/articles/trading/08/negative-basis-trades.asp#axzz2Io8W8UVf, visited on 15.12.2012].

[10] See Adam und Guettler (2014).

[11] It could also be a way to bypass issuer oriented rules in the U.S. that, like the diversification rule, restrict a fund's investments into securities of one issuer to 5% of a fund's TNA. Bonds and CDS would usually be accounted for at market values under this rule, with the latter having a much smaller value, while having the same characteristics when used in combination with Treasury securities to synthesize bonds. See SEC Concept Release on Derivatives (2011).

in both countries can reach the point at which the default is theoretically possible solely due to their investments into derivatives, e.g., by investing into short CDS with a notional amount equal to (and in Germany/the EU, even higher than) the value of a fund's net assets. For example, funds could sell CDS protection written on, e.g., asset-backed securities (ABS), with a notional amount equal to the amount of their net assets (the other investments of a fund are ignored for the moment). If the underlying positions come under economic pressure (as was the case during the last financial crisis), bond funds will be required to pay the notional amount (minus any recovery values of the underlying positions of the CDS) to their contract counterparties. Thus, depending on the engagement of funds in short CDS as measured by the notional amount and on the size of the recovery values, unfortunate circumstances could destroy a large part, or even the entire value of the fund (Gałkiewicz (2014)).

In particular, the U.S. and German/EU regulatory frameworks differ in how they regulate the use of derivatives and leverage by funds. In the U.S., bank borrowing is restricted to 33% of a fund's net assets, while in Germany it is restricted to 10% of a fund's net assets, which is the only form of direct leverage available to them. However, they can implicitly create a similar effect to explicit borrowing (direct leverage) by investing into derivatives or engaging into securities-lending transactions[12] (indirect leverage). For example, a fund can create implicit leverage equal to the notional amount[13] by selling protection via CDS (short position), which is comparable to borrowing the notional amount from a bank and investing it in the principal of a bond. Funds that build high positions in derivatives could create extensive leverage that eventually lead to liquidity problems and drive them into default. Thus, independent from the limits on direct leverage, U.S. and German funds face limits on derivative use. In the U.S., funds, in general, have to earmark portfolio securities or keep offsetting positions as collateral for all potential obligations to a third party created in their portfolio by securities-lending transactions and derivatives. These include e.g., futures, forwards, written options, and short CDS. Theoretically, under U.S. regulation a fund could, at most, sell protection via CDS with a notional amount equal to the value of its net assets and earmark all its portfolio securities as collateral. In Germany/the EU, the potential market risk of a fund, in general, can be doubled by derivative use (as measured by the Value-at-Risk determined at 99% confidence level).[14] Similarly, a fund might sell CDS protection with a notional amount equal to (or even higher than) the value of its net assets as long as its VaR is less than twice as high as a VaR of a comparable fund without derivatives.[15] Thus, by using

[12] E.g., if a fund enters into a repurchase agreement it hands over some of its securities to the counterparty of the transaction and gets instead cash, which is comparable to a collateralized loan.

[13] For derivatives, the notional amount usually reflects the scale of a position with reference to some underlying asset and shows the volume traded during a period of time (McDonald (2009)).

[14] The U.S. approach would be comparable to determining the potential 100%-portfolio loss via VaR. See Gałkiewicz (2014).

[15] Since mid-2011, in addition to the relative VaR, an "absolute" VaR can be calculated (at the 99% confidence level for a 20-(previously 10)-business-day holding period using parameters from previous year). The new VaR measure is subject to an

derivatives, such as short CDS, a fund can create additional leverage in order to circumvent the more strict restrictions on direct leverage. However, once a credit event specified under the CDS contract happens, funds are required to pay the notional amount to the counterparty and receive the defaulted bond (or the amount decreased by the cash equivalent of a bond's recovery value); therefore, they might become illiquid due to extensive leverage. As a consequence of the flexibility provided by regulation, it is possible for funds in both countries to lose a large part of their value due to investments in derivatives, such as CDS, alone.[16] The new regulation decided on in 2009 at the G-20 member states meeting in Pittsburgh does not address these issues as it mainly focuses on restricting the potential for counterparty risk to arise through derivative use. In fact, this kind of exposure was already strictly regulated for mutual funds by various issuer-oriented rules (Gałkiewicz (2014)).

Given this hypothetical flexibility, I investigate whether the largest funds in both countries, which have the highest number of investors, expose themselves to potentially high losses via selling CDS protection.

Furthermore, after crises that are related to derivative use, regulators usually prefer to tighten disclosure rules in order to protect investors instead of restricting derivative use directly (e.g., SEC Staff report (1994), CFA Report (2011), and CFA Report (2013)). Against this background, the subsequent analyses might give insight into how effective this kind of protection is when CDS and corporate bond funds are considered. According to the Investment Company Act (ICA) of 1940, U.S. funds are required to inform investors about derivative use in statements of incorporation (Form N-1A), prospectuses, Statements of Additional Information (SAIs), and periodic reports.[17] The statement of incorporation contains information about a fund's intention to use derivatives, while the prospectus comprises information about a fund's current use of derivatives (or alternatively, its intention to use derivatives). The SAI includes general detailed descriptions of a fund's (or a fund family's) derivatives handling (by type), while the report comments describe the derivative strategies applied by a fund together with a brief derivative handling (by type). By contrast, German funds are only required to inform investors about potential derivative use in the terms of the contract contained in the extended prospectuses. However, comments on derivative use in the terms of the

"absolute" limit of 20% of the value of the fund. Since mid-2011, UCITS funds also have to hold sufficient liquid funds for cash settled derivatives and the underlying position or sufficient liquid funds for physically settled derivatives (if the underlying asset is highly liquid and can be purchased on the market at any time). However, the exact amount is up to discretion.

[16] For the information contained in this paragraph, refer to Gałkiewicz (2014), CIL/KAGB [2013], Derivative Order/DerivateV (2011), CESR Guidelines (2010), SEC Concept Release on Derivatives (2011), ICA (1940), SEC Release 10666 (1979).

[17] Funds in the U.S. often face specific internal restrictions on derivative use as suggested for equity funds by Almazan, Brown, Carlson, and Chapman (2004).

contract largely follow the general wording of the law. Additional simplified prospectuses issued to the public in the EU provide general information about a fund's investment strategy without explicitly referring to derivatives; since mid-2011, they are known as the more standardized Key Investor Information Documents (KIIDs).[18] Compared to the U.S., the public reports of German funds contain only a brief description of a fund's investment strategy during a specific period (including voluntary comments on derivative strategies applied by a fund). Moreover, all CDS policies pursued by funds in both countries should be in line with their type and investment strategy as stated in the prospectuses (and also statements of incorporation in the U.S. or the terms of contract in Germany/the EU).

Given that the disclosures of U.S. funds are more extensive than those of German funds, I analyze whether the descriptions contained in the annual and semi-annual fund reports were consistent with the disclosed CDS holdings. In particular, I investigate whether the comments funds make about their CDS policies allow readers of the reports to assess the extent CDS are used for hedging, speculation, or non-speculative purposes (e.g., replicating securities).

An empirical analysis of the level of CDS use and of the disclosures by funds allows this study to assess whether prevalent restrictions on derivative use are protecting investors from potentially significant losses and the accuracy of information funds provided to investors about their derivative policies. This might reveal a need to modify existing regulation in order to better protect investors – many of whom might not be aware about the possibility of a fund losing a large share of its portfolio due to derivative holdings.

4 Data

4.1 Data Description

In order to investigate CDS holdings and disclosures, the analysis focuses on semi-annual and annual reports of the largest U.S. and German corporate bond funds[19] from 01.07.2004 to 31.12.2010 (13 periods). The sample period starts in 2004 because prior to 2004, German funds were not allowed to use CDS and since 2004, U.S. mutual funds are required to disclose their portfolio holdings (with derivatives) on a quarterly basis. However, since German bond funds only report semi-annually, I only consider the U.S. semi-annual and annual reports, which provide investors with the most

[18] In addition, since 2011, the German regulator BaFin requires mutual funds to report their derivative strategies separately from the public reports and directly to the BaFin (Derivative Order/DerivateV (2011)). See Gałkiewicz (2014).

[19] The term "German funds" refers to funds distributed to investors in Germany. However, some of the sample funds are legally incorporated in Luxemburg where the new regulation was implemented in 2002 (and took full effect in 2004).

comprehensive explanations of a fund's investment strategy. The U.S. reports are either downloaded directly from the SEC webpage or via the EDGARpro database, while German reports are directly provided by the investment companies upon request. In addition, I analyze some prospectuses and Statements of Additional Information (SAI). To determine the sample of funds, I follow Adam and Guettler (2014) by excluding money market funds, treasury funds, municipal funds, mortgage funds, index funds, and fund reports after a merger occurred[20] from the sample. The U.S. funds belong to the following Lipper fund classes: corporate debt funds A-rated, corporate debt funds BBB-rated, short investment grade, short-intermediate investment grade, intermediate investment grade, multi-sector income, and high current yield funds. For the results to be interesting for a wide group of investors and comparable to previous research, the study analyzes the 30 largest corporate bond funds, as determined by TNA, that are included in the CRSP Survivor-Bias-Free U.S. Mutual Fund Database as of the end of the second quarter of 2004.[21] This results in a total of 389 reports.

Table 1 contains the names of the top 30 U.S. corporate bond funds as of the second quarter of 2004 and their respective TNA. The largest fund in the sample is the Total Return Fund of the PIMCO fund family with a TNA of $73 billion, while the smallest fund in the sample is the Sanford C. Bernstein Fund's Intermediate Duration Portfolio with a TNA of $2.7 billion. The study includes periods in which U.S. funds use CDS, thus, the final sample contains 192 reports.

Bond funds distributed in Germany are grouped based on the BVI-Classification[22]: fixed income funds investing mainly in Euro; fixed income funds investing mainly in German issuers (both may be combined with the sub-classes of short-term bond funds, middle-term bond funds, and long-term bond funds); fixed income funds with variable investments; and fixed income funds, corporate bonds. The German sample is restricted to funds that mainly hold investments in the Euro-Area (U.S. funds focus on U.S. investments). Additionally, fixed maturity funds and funds only invested in money market instruments and government securities are removed to make the sample as comparable as possible to the U.S. sample. Some reports are missing, but they are expected to only have a minor impact on data quality since most of the funds don't hold CDS around the missing dates.[23]

[20] The Evergreen Core Bond Fund merged with another funds in July 2010. Thus, the last report is not considered.

[21] An exact matching of the sample starting date was not possible due to data constraints. Thus, U.S. funds are classified as of June 30, 2004, while German funds as of December 31, 2004.

[22] See BVI Classification [http://www.bvi.de/fileadmin/user_upload/Statistik/BVI_Abkürzungsverzeichnis.pdf, visited on 24.01.2013], p. 1, 11, 16. The BVI was set up in the year 1970 as "Bundesverband Deutscher Investment-Gesellschaften" (German Federal Association of Investment Companies) and is currently known (since 2005) under the name "Bundesverband Investment und Asset Management e.V." (German Federal Association of Investment and Asset Management). All companies represented in Germany, except some small or foreign companies, are members; 99% of overall funds' TNA is represented by this association. See BVI Jahresbericht 2008, p. 18. According to Lehmann and Stehle (2013) 90% to 95% of all investment funds distributed in Germany are captured by this database.

[23] Two funds only report annually (top30de, No. 20, 25). Additionally, one report is missing for 2010 for fund No. 25 (however, the fund does not use CDS before 2010). Moreover, three reports are missing for fund No. 14 (for the 31.03.2006,

Additionally, some prospectuses (the simplified one and the comprehensive one) and terms of contract are analyzed. Since the reports of Allianz PIMCO Euro Bond Total Return Fund (that would be ranked by TNA as place 16) are not available, I include the next fund, resulting in a total of 361 reports from the 30 largest German bond funds. In general, the reports of funds distributed to the German public should be accessible via the "Online Bundesanzeiger", but unfortunately only a few reports can be found on this webpage. Since the study focuses only on German funds using CDS (at period end or within period), the final sample contains 114 reports. End-of-period CDS holdings are provided in 106 of the reports, and the cumulated amounts of CDS turned over within the period are given for an additional 49 of them. Furthermore, the amount of CDS turned over within the half-years are reported for 8 cases without showing any CDS positions at the end of the period. In the 192 U.S. and 114 German fund reports, I search for details regarding CDS positions (i.e., CDS notional amounts of bought and sold positions, market values of CDS and a fund's TNA) in the schedule of portfolio holdings. For the purposes of this study, I aggregate positions at the fund-quarter level and convert Euro amounts into U.S. dollar using the exchange rate for the respective reporting date.

Table 2 presents the 30 largest funds (as measured by a fund's TNA at the end of 2004 in the BVI database) distributed in Germany (from now on referred to as German funds). The largest German fund in the sample is the dit-Euro Bond Total Return of the Allianz Global Luxemburg fund family with a TNA of $6.3 billion. The smallest fund is the Deka-CorporateBond Euro with a TNA of $0.591 billion. As seen in **Table 1** and **2**, the 30 largest U.S. and 30 largest German funds significantly differ in terms of size. All U.S. funds are at least four times larger than their German counterparts. This might have an effect on the size of the derivative holdings, which is expected to be higher for larger funds due to cost saving arguments (Koski and Pontiff (1999)).

4.2 Variable Definition

In order to perform the analyses specified in section 3, two proxies are determined to gain insight into the lowest and highest potential fund loss due to CDS (i.e., for the case that all short CDS are triggered and the recovery value of the underlying positions is equal to zero[24]): the notional amount from CDS short positions and the CDS net notional amount. This potential fund loss shows what a

31.03.2009, 31.03.2010; however, the fund does not use CDS before 2007). Furthermore, two reports are missing for 2007 for fund No. 10 (however, the fund does not use CDS before 2010), and two reports are missing for fund No. 15 (for the 31.03.2009 and 31.03.2010, however, this fund does not use CDS around those dates). The following funds merged with another funds, thus, as in Adam and Guettler (2014), reports after the merge dates are not considered (top30de, No. 3 on 19.03.2010, No. 12 on 23.04.2010, No. 22 on 09.04.2010, No. 23 on 16.04.2010, No. 24 on 31.03.2008).

[24] In reality, these potential obligations would be partially offset by any recovery values of the referenced debt obligation. However, this assumption is made following U.S. regulation.

fund can lose in addition to the potential 100% of TNA loss it can suffer from other portfolio investments.

The size of the CDS net notional amount (CDS net notional) and notional amount from short CDS positions (short CDS positions) are good approximations for determining the size of potential future obligations arising out of CDS use by funds. According to U.S. regulation, short CDS positions reflect the highest level of potential future obligations (future undiscounted payments) a fund must cover. In the absence of long CDS, and if short CDS are used for speculation only, the potential future obligations from CDS indicate the highest possible fund losses over and above its potential losses from other portfolio securities. Additionally, CDS net notional is used, which is a more conservative measure of potential obligations and assumes a fund's long and short CDS positions offset each other. However, it should be noted that the sample funds seldom hold long and short CDS positions on exactly the same securities to cancel existing positions in terms of notional amount, coupon, and maturity. Regarding leverage regulation, long CDS reflect, in general, negative leverage because a using long CDS is equivalent to shorting a bond and investing the notional value of the CDS into Treasury securities. Thus, this proxy also reflects the amount of indirect leverage a fund keeps. The size and direction of the CDS net notional allows an estimation about whether CDS were largely used for hedging (+) or for gaining exposure (-), as suggested by Adam and Guettler (2014). When construing these measures of potential fund obligations, it is implicitly assumed that all short CDS underlying positions could simultaneously fall under economic pressure even if they comprise CDS written on various single- and multi-name references. To some extent, this was the case during the 2007-2009 financial crisis.

5 Results

First, I investigate the level of CDS use and the potential for realizing losses via CDS for U.S. and German corporate bond funds under current regulation. Second, based on period-end and within-period CDS data, which are only available for German funds, I investigate to which extent the former are representative of a fund's investment behavior within the period. Third, I analyze the information funds provide to investors about their CDS policies in both countries.

5.1 CDS Use and Potential to Realize Losses via CDS in the U.S. and Germany

CDS were held by 19 out of the 30 sample U.S. funds in 192 half-years between the end of 2004 and 2010 and by 19 out of the 30 sample German funds in 106 half-years across the same time period as

indicated by period-end data. Additionally, 13 German funds list the amount of cumulated CDS notionals sold within the period in 57 half-years in their reports. In the U.S., the number of CDS users increased from 11 in the second half of 2004 to 17 funds in the second half of 2007, and then decreased to 13 funds in 2010. Likewise, the number of CDS users in Germany increased from 1 in the second half of 2004 to 15 funds in the second half of 2007 and first half of 2008 before it started to vary between 9 and 13 funds after 2008 (**Figure 1**). Funds in both countries usually held many CDS contracts, which were partly written on single-name corporate (and seldom sovereign) references and partly on multi-name indices such as iTraxx or CDX. As shown in **Table 3** and **4**, the sum of all CDS positions (long and short CDS) held by U.S. funds over the entire sample period was on average 7.84% of TNA ($1,181 mio.), compared to 17.33% of TNA ($175 mio.) in Germany.[25] The largest CDS positions within the observation period were held by the U.S. Fidelity Short-Term Bond Fund (129.09% of TNA or $33,778 mio.) and Deka-CorporateBond Euro (160.89% of TNA or $592 mio.).[26] **Figure 2** shows that the total size of the CDS positions increased from an average of 2.28% in 2004 to 4.58% of TNA in 2010 for U.S. funds and from 1.56% to 9.65% for German funds during the same time period. At the beginning of 2007, after the new EU-wide regulation was fully implemented by the funds registered in Germany, CDS positions increased significantly. Especially after the initiation of CDS use, the average percentage observable for German funds was higher than for U.S. funds. Given the fact that German funds did not have prior experience using CDS, this trend is surprising. While U.S. funds reduced their overall CDS positions after the height of the crisis in the second half of 2008, German funds continued to hold substantial CDS positions until mid-2009.

Figure 3 distinguishes between long CDS (protection bought) and short CDS (protection sold) positions as related to a fund's TNA. German funds maintained significantly larger CDS long and short positions than U.S. funds, except in the second half of 2008 where U.S. funds had larger short CDS positions. While U.S. funds started to successively reduce their CDS positions, German funds began to build significant short positions again in 2010. Additionally, U.S. funds also reduced long positions after 2007 and 2008 when credit risk premia were the highest, while German funds first increased their long CDS positions before reducing them in 2010. **Figure 4** graphs the CDS net positions (long – short) over time, measuring the fund's net exposure to credit risk compared to the credit risk premium (measured by the yield difference between BBB-rated debt and Treasury securities). The

[25] I report the mean values of CDS for the sample of funds that used CDS, which changes over the selected time period. The mean and median values as presented in **Figures 2** to **4** often differ by a large amount, which is due to outliers. Thus, some average figures overemphasize trends in general CDS use. However, for the purposes of this study, it is more important to estimate what is potentially possible under current regulation, i.e., the results obtained for the extreme cases are of large importance. The analysis of extreme cases shows the shortcomings of mutual fund regulation and a potential lack of protection for corporate bond fund investors.

[26] These percentages reflect the potential leverage from CDS defined under EU law as the sum of CDS notional amounts (CESR Guidelines (2010)).

CDS net position for both countries were persistently negative, with the exception of German funds in the second half of 2009. Overall, there were no significant differences between the average net strategies pursued by funds in both countries (**Table 5**), which were net short until the end of 2008 when the credit risk premium rose significantly. Hence, in the worst case scenario, if funds used short CDS as a speculative tool (and not for synthesizing bonds) during the financial crisis, this strategy could have led to substantial losses due to the large increase in credit risk premia during this time (see **Figure 4**).[27] The above results are in line with those of Adam and Guettler (2014) who find that U.S. corporate bond funds are net sellers of CDS, implying that managers, on average, do not use CDS to hedge credit risk.[28]

One cannot determine the effect changes in CDS use have on a fund's risk and performance profile without taking into account parallel changes in asset allocation or changes in the overall investment strategy of a fund.[29] However, the market (fair) value of CDS (unrealized depreciation/appreciation) shows how much a fund's TNA was negatively/positively affected by CDS contracts at a specific reporting date. This accounting value is more than ten times smaller than the CDS notional amount. As shown in **Table 4**, the average unrealized value for U.S. funds equaled -0.25% of TNA with the highest value of -8.10% of TNA observable in the second half of 2008. The values are lower for German funds: The average unrealized value equaled -0.10% of TNA with the highest value of -1.63% of TNA observable in the first half of 2009. Given the average return of 0.54% for U.S. corporate bond funds between 2004 and 2010 (Adam and Guettler (2014)), the highest and average unrealized losses in fund value due to CDS observable at reporting date were substantial for both countries.

Although definite conclusions about speculation require access to the portfolio holdings of funds, the current data on CDS allow the analysis of the potential for realizing losses via CDS beyond the potential 100% of TNA loss the fund can suffer from other portfolio investments. As **Table 4** shows, the mean (median) short CDS positions of U.S. funds equaled 5.47% (2.03%) of TNA for the entire sample period. **Figure 3** shows that short CDS positions increased over time from an average of 1.46% of TNA in 2004 to 3.68% in 2010, with a peak of 15.14% in the second half of 2008. As shown in **Table 6**, the largest short CDS positions of the top30us funds no. 14 and 24 reached 93.82% and 61.66% of

[27] In 2009, when the credit risk premia were falling, German funds went net long. From the perspective of a speculative strategy (market timing), it would have been better to stay net short during this time. The net short exposure of German funds increased only in 2010, which might have been a beneficial speculative strategy because of falling credit risk premia. In 2009 and 2010, U.S. funds successively reduced their CDS holdings while keeping an almost constant net exposure to credit risk. From the perspective of a speculative strategy, they might have benefitted from staying net short during this time, but not necessarily from the reductions.

[28] The authors further show that U.S. funds pursuing net short CDS strategies during the crisis had alphas, which were 51-80 basis points lower per month than these of funds that were net long.

[29] Recent research provides evidence that sold CDS are mostly perceived as a risk increasing tool: For example, Van Ofwegen, Verschoor, and Zwinkels (2012) give evidence that banks sell CDS to increase their risk exposure.

TNA, respectively, indicating that if CDS were used for speculative purposes only (not for synthesizing bonds in combination with Treasury securities), potential additional losses from short CDS exposure could have been as high as 93.82% and 61.66% of TNA for these two funds. However, the majority of U.S. funds held moderate short CDS positions that did not exceed 15% of their TNA and did not lead to negative net CDS positions higher than 15% of their TNA. For U.S. funds, the mean (median) CDS net notional equaled -3.10% (-1.32%) of TNA for the entire sample period (**Table 4**). The average negative CDS net notional increased over time with a remarkable peak of -9.89% in the second half of 2008 and was persistently negative, which indicates that U.S. funds took on more risk than they hedged (see **Figure 4**). As shown in **Table 6**, for most of the U.S. funds the CDS net notional ranged from ca. 12% to -15% of TNA. However, for two funds (top30us no. 14 and 24) the negative net notional (and indirect leverage) reached a value of 58.54% and 54.46%, respectively. By looking into the periodic reports, one can observe that these funds were highly diversified (one of them included "diversified"[30] into its name to attract investors with this feature) and that it might have been beneficial for them to use many short CDS for synthesizing bonds or indices. Indeed, discussions with practitioners confirm that many funds kept higher cash positions in their portfolios (especially those facing higher outflows) during the crisis and used short CDS to increase their exposure to individual names and the market. Nevertheless, if CDS were used by these two funds only for speculative purposes, losses from CDS net exposure could have been as high as 58.54% and 54.46% of TNA.

As **Table 4** shows, the mean (median) short CDS positions of German funds equaled 10.91% (5.09%) of TNA for the entire sample period. **Figure 3** shows that the average short CDS position increased over time with a peak of 20.95% in the first half of 2008. As opposed to U.S. funds, several other German funds presented in **Table 7** (top30de no. 1, 8, 12, and 14) sometimes kept a relatively high amount of short CDS, ca. 40% of TNA, which led to negative net positions in CDS (and indirect leverage) of around 30% of TNA at reporting date. Again, since these funds are generally required by law to be highly diversified (CESR Guidelines (2010)), it might have been beneficial for them to use many short CDS for synthesizing bonds or indices. However, if CDS were used only for speculative purposes, a German fund's loss from short CDS exposure could have been up to 127.04% of TNA – 1.35 times higher than for an individual U.S. fund. The largest short CDS position of 127.04% of TNA of top30de fund no. 30 occurred in the first half of 2008. For German funds, the mean (median) CDS net notional equaled -4.48% (-1.46%) of TNA for the entire sample period (**Table 4**). The average negative CDS net notional increased over time with a peak of -12.94% in the first half of 2008 (**Figure 4**). As shown in **Table 5,** there were significant differences in CDS use between U.S. and German

[30] U.S. funds are generally required by law to be diversified with regard to security issuers (SEC Concept Release on Derivatives (2011)).

funds, except for the net exposure from CDS. However, these differences might be partially driven by the first occurrence of higher CDS amounts at German funds during the time of the crisis when the size of the CDS market peaked. The CDS net notional ranged from 21.22% to -93.19% of TNA with the largest negative net notional (top30de fund no. 30) being 1.6 times higher than for individual U.S. funds. Thus, if CDS were only used for speculative purposes (not for synthesizing bonds), a German fund's loss from CDS net exposure could have been as high as 93.19% of TNA (vs. 58.54% of TNA for an individual U.S. fund).

Figure 5 and **6** compare the Deka-CorporateBond Euro Fund's (top 30de fund no. 30) and the Putnam Diversified Income Trust's (top30us fund no. 14) CDS long and short positions together with their half-year returns between 2004 and 2010. These funds used large amounts of short CDS (127.04% and 93.82% of TNA, respectively) in the middle of the crisis and decreased the amounts shortly afterwards. Although the levels of indirect leverage of 93.19% and 58.54% of TNA, respectively, created this way were in line with existing regulation, one can only speculate why these funds used such high levels of CDS. From a credit market timing perspective, increasing short CDS positions until the middle (Deka-CorporateBond Euro) and the end (Putnam Diversified Income Trust) of the crisis such that they surpassed multiple times the size of long CDS at times when the level of credit risk premia was increasing (**Table 4**), possibly led to losses (Adam and Guettler (2014)). A large part of the short CDS could have been used to increase the riskiness of the fund (and its potential to gain or lose) above the usual level as well.[31] In the second half of 2008, DekaCorporate Bond Euro Fund rapidly decreased its short CDS and kept positions of less than 5% of its TNA in short CDS once performance recovered. A similar pattern is observable for Putnam Diversified Income Trust. Its short CDS peaked in the second half of 2008 and gradually decreased in 2009 to less than 5% of its TNA once performance recovered. This indicates that this U.S. fund might have sold CDS protection primarily to synthesize regular bonds and to add risk. This is evidence that funds are able to circumvent direct leverage restrictions, which limit bank borrowing to 10% and 33.3% of a fund's TNA in Germany/the EU and the U.S., respectively. Funds in both countries can inflate overall leverage by using derivatives, such as CDS, to levels that lie above the value of funds' net assets. This high level of flexibility was not originally envisaged by regulators and might not be in the best interest of investors.

The above findings show that the potential realizable losses from CDS might be higher than a fund's net assets in Germany, while in the U.S., they might be almost as high as a fund's TNA. The case of the

[31] Funds might also have entered into short CDS to earn the premium on sold insurance in order to hide their bad performance around the crisis. However, because of rising credit risk premia, the unrealized loss from short CDS at that time would possibly negatively affect the value of a fund's net assets. Long CDS entered into by a fund in the pre-crisis period could have, if not cancelled before, positively impacted the value of a fund's net assets during the crisis.

Oppenheimer Champion Income Fund, which lost 80% of TNA largely due to CDS use, shows that potential loss from derivatives can materialize. Thus, irrespective of how unlikely it is that all CDS underlying positions fall under economic pressure simultaneously, it might be worthwhile to reconsider the flexibility funds have under current regulation. To better protect unsophisticated investors from potentially significant losses due to derivative transactions, the potential future obligations from derivatives used for speculation could be restricted to a reasonable level below a fund's TNA, as suggested by Gałkiewicz (2014). Based on the empirical results, one can see that stronger restrictions on the use of the CDS would not affect the majority of U.S. or German funds. Stronger restrictions would rather benefit the mutual fund industry as a whole because they could prevent potentially high, and long-lasting, losses due to outliers.

Furthermore, the observed cross- and within-country variations in CDS use might be the outcome of different regulatory regimes and/or fund characteristics, such as membership in a fund family, size, age, expense ratio, turnover ratio, investment style, management structure, and manager characteristics. For example, Koski and Pontiff (1999), Johnson and Yu (2004), and Marin and Rangel (2006) find that the use of derivatives is correlated with fund related variables, such as size, age, asset turnover and membership in a fund family for a sample of U.S., Canadian, and Spanish mutual funds, respectively. Further research should shed light on the within-country variations and relate them to cross-country variations.[32] The trends in CDS use are in line with the findings of Adam and Guettler (2014). I contribute to this literature by providing insights into the investment behavior of German funds with regard to CDS and by analyzing the level of potential losses and indirect leverage of U.S. and German corporate bond funds due to CDS use.

5.2 Representativeness of CDS holdings of German Funds Reported at Period End

One of the main disadvantages of using semi-annual CDS holdings data is that round-trip trades occurring within half of a year (i.e., the purchase and sale of CDS – or the other way around – that take place between two consecutive reporting dates) are missed. However, gains and losses generated by CDS holdings within the reporting period could have already affected the fund's TNA via the realized gains and losses position. In this case, German data, which specify the level of fund activity within the reporting period, provide additional insights compared to U.S. data. The German reports comprise an initial and second schedule of portfolio holdings; the second schedule shows all

[32] Adam and Guettler (2014) compare the risk and return profiles of U.S. funds using CDS with those of nonusers around and during the financial crisis, while controlling for various fund characteristics. Although beyond the scope of this paper, determining the risk and return profiles of German funds using CDS (at period end and within period) and comparing them to U.S. results could provide new insights about the investment strategies of funds.

transactions closed within the reporting period, including the cumulated CDS sales (reflected by the sum of long and short CDS notional and often by the individual long and short CDS).[33] Analyzing how active funds are in trading CDS within a half-year helps clarify to which extent end-of-period CDS holdings are representative of a fund's investment behavior within the period.

In order to approximate CDS turnover and examine the number of missed trades, I focus on a subsample of 13 German funds that report cumulated within-period sales of CDS in 57 periods.[34] The aggregate sales of CDS capture the decrease in CDS holdings between the past and present reporting dates (i.e., sales of CDS) and within-period CDS trades where purchases are followed by sales. However, one erroneous observation[35] is deleted. Thus, for the final sample consisting of 56 observations, I define an approximated (volume based) CDS turnover ratio and, because turnover ratio data are not available for German funds, a variable showing missing trades. **Figure 1** shows that the number of German funds reporting within-period CDS increased from 1 in 2005 to 8 at the end of 2007 before it started to vary between 5 and 8 funds afterwards. This corresponds to the development of the number of funds reporting the use of CDS at period-end, suggesting that some funds repeatedly used CDS in the second half of the calendar year.

Following the common definition of the fund turnover ratio[36], an approximated CDS turnover ratio is constructed as the ratio of the minimum of aggregate sales or aggregate purchases of CDS (measured by the notional) and the average of present and past end-of-period CDS notional of a fund. In order to determine the approximated CDS turnover, I first calculate the aggregate purchases of CDS of a fund by adding the aggregate sales of CDS to the difference in CDS notional between present and past reporting date.[37] The final approximated CDS turnover ratio reflects the minimum of aggregate sales or aggregate purchases of CDS of a fund scaled by its average CDS notional (the CDS turnover is missing for five observations because the average CDS notional is zero). Lastly, I create a variable showing the missing trades in percentage of aggregate CDS by subtracting the period-end difference

[33] Funds originating in other EU countries, such as Luxemburg, are not all required by law to list derivatives in this schedule.
[34] Notice that 12 out of 13 funds report at 49 period ends corresponding CDS holdings and thus, without knowing about the existence of within-period data, one would have to rely on 49 instead of 57 observations. However, to fully exploit the information contained in within-period data, I include zeros for the 8 missing period-end values for which aggregate (within-period) sales of CDS are available to account for the fact that these funds are CDS users during those periods.
[35] In this case, the decrease in CDS notional amounts between past and present reporting dates was higher than the respective amount of aggregate (within-period) sales of CDS.
[36] The annual fund turnover ratio is defined as the minimum of either aggregate sales or aggregate purchases of securities divided by the average 12-month TNA of the fund. See CRSP Guide (2012). Mutual funds use the exact timing and prices at which purchases and sales of securities take place when computing turnover. A turnover estimated based on, e.g., monthly data, is less precise than daily estimates because the transaction prices are approximated by the average price over the month. See Elton et al. (2010).
[37] The difference is negative whenever the CDS notional decreases from the past to the present reporting date.

in CDS notional (the absolute value) from either the aggregate sales or purchases (whichever value is higher) and dividing the entire expression by the respective aggregate sales or purchases.

Table 8 presents the distribution of the period-end difference in CDS notional, aggregate purchases of CDS, aggregate sales of CDS (within-period), the (approximated) CDS turnover ratio and the missing trades for the 56 observations. Differences in these estimates result from missing round-trip CDS transactions over the half-year. Additionally, for a smaller subsample of 43 observations (for which within-period data on long and short CDS are available), the fraction of aggregate purchases of long CDS out of aggregate purchases of CDS is determined. The increase of CDS, implied by period-end data, ranged up to $818 mio., while the decrease of CDS was generally smaller and reached $577 mio. The aggregate CDS purchases ranged from ca. $0.5 mio. to $8,151 mio. and aggregate CDS sales from ca. $4 mio. to $8,186 mio. The CDS turnover was, on average, around 6.73 times higher than a fund's average CDS holdings implied by period-end data. The median (75th-percentile) CDS turnover was around 0.94 (4.20) times higher than a fund's average CDS holdings. The variation in this number was large, with the highest CDS turnover being 140 times higher than a fund's average CDS holdings, indicating a high level of heterogeneity across portfolios in terms of CDS use. Thus, almost half of the observed cumulative amounts of CDS traded over the course of a period (either frequently turned over in smaller amounts or infrequently in higher amounts) were higher than a fund's average CDS holdings as implied by period-end data.

The variable missing trades shows that changes in CDS holdings implied by period-end data, on average, reflect 37.34% of aggregate CDS trades derived from period-end and within-period data. For observations that equal to or lie above the median, between 67.28% and 100% of aggregate CDS trades remain undetected; 100% of aggregate CDS are unobserved whenever a fund undertakes round-trip CDS trades without showing any CDS on reporting date. Additionally, **Figure 7** shows the development of the median missing CDS trades over time. A high fraction of aggregate CDS trades not explained by period-end differences was observable in every second half of the year between 2007 and 2010. As shown in **Figure 1**, the number of funds reporting CDS within-period also increased in every second half of the year between 2007 and 2010, suggesting that some funds undertook many round-trip CDS trades in the second half of the year. The reasons for this timing remain unclear.[38]

As shown in **Table 9**, 39 of the 56 period-end differences in CDS notional were positive, indicating an increase of CDS by funds, and 17 were negative, suggesting a decrease of CDS in the respective half-

[38] These funds might use CDS for portfolio rebalancing or window-dressing at year end (Elton et al. (2010)).

years. Interestingly, the aggregate sales and purchases of funds that decreased CDS in the respective period were higher than the aggregate sales and purchases of funds that increased CDS in the respective period for the entire sample. At the same time, a smaller fraction of missing trades was observable for funds that decreased CDS over the course of the period, as compared to funds that increased CDS. This indicates that funds decreasing CDS trade higher amounts of CDS less frequently (keep the CDS positions in their portfolios for a longer time period). By contrast, funds that increased CDS in the respective period undertook more CDS trades (purchases and sales or sales and purchases of CDS) within-periods that remained undetected. This shows that these funds either frequently turned over small amounts of CDS, which could have been in line with their investment strategy (e.g., short-term orientation), or misrepresented actual CDS holdings at period end because funds using CDS mainly for non-speculative reasons (e.g., hedging or synthesizing bonds), would keep these positions open in their portfolios for a longer time period.

The aggregate (within-period) sales of individual long and short CDS are known for a smaller subsample of 43 fund-half-years. Based on this additional information, it is observable that funds that increased CDS in the respective period (for median values, not average values) increased more long CDS than short positions. Funds that decreased CDS during the same time period decreased more short CDS than long positions (both for average and median values). However, definite conclusions about the purpose of CDS use require the portfolio holdings of funds and a wider database.

Overall, almost half of the observed cumulative amounts of CDS sold between the two consecutive reporting dates were higher than a fund's average CDS holdings, as implied by period-end data. The above evidence further suggests that management undertook many round-trip CDS trades (purchases followed by sales or the other way around) within periods that remained undetected, with some funds trading CDS repeatedly in the second half of the calendar year. In particular, funds that increased CDS undertook more undetectable round-trip CDS trades than the funds that decreased CDS during the same time period. Thus, either these funds frequently turned over small amounts of CDS following their general investment policy or misrepresented CDS holdings at period end. Further examination of these issues might be a promising field for further research.

5.3 The Comparison of Disclosed CDS Holdings and Report Comments of Funds

The derivative and leverage policies of mutual funds are important for regulators, especially when it comes to adequate disclosure by market participants, as indicated by various SEC publications (e.g., SEC Staff report (1994), SEC Letter to the GCotICI (2010) and SEC Concept Release on Derivatives

(2011)). This study examines the CDS related risk information disclosures in annual and semi-annual reports of U.S. and German funds to check whether the long and short CDS holdings aggregated at the fund level are consistent with the comments in the annual and semi-annual reports of funds at the same reporting date. The direct comparison of comments and CDS positions provides insight into one aspect of the investment behavior and disclosure policy of U.S. and German corporate bond funds. Furthermore, this demonstrates the usefulness of the information disclosed to the investors.

The studies of Hodder, Koonce, and McAnally (2001), Beretta and Bozzolan (2004), Lajili and Zeghal (2005), together with the newest CFA Reports (2011) and (2013), show that the disclosure of risk by public companies is often of limited use to shareholders due to the lack of uniformity, clarity, and quantification. Furthermore, not only the quantity, but also the content, determines the quality of disclosures. Hoering and Gruendl (2011) report that there are still large inter-insurer and inter-cultural differences in risk disclosure, while Malafronte, Porzio, and Starita (2013) find that the annual reports of insurers are difficult to read. Regarding the disclosures of mutual funds, the SEC letter to the General Counsel of the Investment Company Institute (2010) stresses that there is a wide variety of derivative disclosures, ranging from highly abbreviated "to lengthy, often highly technical, disclosures that detail a wide variety of potential derivative transactions without explaining the relevance to the fund's investment operations."[39] Additionally, the SEC highlights that risks faced by funds should be explained in connection with the respective derivative strategies. The SEC is concerned about the descriptions, which often give the impression that a fund faces high exposure when it actually does not, and vice versa.[40] For example, the Oppenheimer Champion Income Fund was blamed by the public for its generic, boilerplate disclosure.

Given the differences in disclosure regulation between both countries (presented in section 3), I focus on annual- and semi-annual fund report comments in order to compare stated CDS strategies with disclosed CDS holdings between 2004 and 2010.

5.3.1 The Nature of CDS Related Comments Disclosed by U.S. Funds

All U.S. funds are required to comment on their holding positions, including various derivative positions, in the notes section of their reports. The **Appendix** contains an example of comments on CDS provided by a U.S. fund. In addition, the majority using CDS (12 out of 19) irregularly indicated the use of derivatives and associated risks in the section of the report that contains a short discussion of fund performance. For the purpose of this study, I only focus on the comments on CDS use in the

[39] SEC Letter to the GCotICI (2010), p. 2-3.
[40] See SEC Letter to the GCotICI (2010), p. 3-4.

report notes. In general, notes were shorter from 2004 to 2007 than from 2008 to 2010. Between 2004 and 2007, funds always provided a short technical definition of CDS, some comments on valuation (mark to market), and short remarks on the strategies behind CDS use. Starting in 2008, the information content within the notes became higher due to the increase in explanatory notes on the technical functioning of different CDS types and on various risks associated with CDS use. Additionally, the notes often provided more detailed information regarding a fund's CDS strategies, the amount at risk, and triggering events. This observable change was due to an amendment to the FAS 133[41], which requires more extensive disclosure. In particular, the amendment requires funds to state the nature and the terms of derivatives, give reasons for entering into those instruments, specify events that require the seller to perform under a contract, and describe the current status of the payment/performance risk with regard to the contract. Moreover, funds have to post information about the highest potential amount that the fund could be liable for as a contract seller, the fair value of the contract, and the nature of any recourse provisions/assets held either as collateral or by third parties.

As discussed in section 2, funds enter into long CDS and short CDS for various purposes. Beyond offsetting existing long CDS positions, funds may use CDS selling protection to gain exposure to risk by timing credit markets and creating levered or unlevered bond positions. Over and above hedging portfolio risks, funds may use CDS buying protection to perform negative basis trades or to time credit markets. All 19 funds that use CDS commented on their holdings in 192 half-years. These comments on CDS were in line with the disclosed CDS holdings because almost all of the funds stated that they entered into CDS contracts to buy or sell protection on an underlying position – this general comment formulation justifies every CDS strategy applied by a fund for any purpose. Funds rarely made concrete and specific statements about CDS related strategies. In particular, the 13 funds that did not have long CDS, i.e., they pursued short CDS strategies for non-hedging purposes, stated to buy and sell CDS for a wider range of purposes in 53 out of 192 half-years (not reported). Only two funds stated and actually only used short CDS in 17 half-years. Surprisingly, while not having short CDS, i.e., pursuing long CDS strategies, 4 out of the 19 funds that used CDS stated to buy and sell CDS for a wider range of purposes in 7 out of 192 half-years. Only one fund stated and actually only used long CDS in 2 half-years. Furthermore, the CDS comments of funds belonging to one fund family (i.e., PIMCO, Fidelity, Vanguard) were close to identical. This is in line with the SEC observation that

[41] See FASB Staff Position No. FAS 133-1 and FIN 45-4, "Disclosures about Credit Derivatives and Certain Guarantees: An Amendment of FASB Statement No. 133 and FASB Interpretation No. 45." The amendment extends the interpretation of FASB Statement No. 133 ("FAS 133"), "Accounting for Derivative Instruments and Hedging Activities", and the FASB Interpretation No. 45 ("FIN 45"), "Guarantor's Accounting and Disclosure Requirements for Guarantees, Including Indirect Guarantees of Indebtedness of Others." See FASB ASC 815-10 (2009).

comments are often prepared for a particular fund family and not for a specific fund (SEC Letter to the GCotICI (2010)). Thus, U.S. funds could have been more specific about their CDS strategies in 60 out of 192 half-years. These findings further indicate that funds only pursuing short CDS strategies, which are associated with non-hedging activities, give the impression of using long and short CDS for a wider range of purposes. It remains unclear whether they do this intentionally or unintentionally.

As previously mentioned, the quantity of information provided in the notes has increased since 2008. For example, starting in 2008, the information content within the notes increased for PIMCO and Vanguard funds. This is primarily due to the increase in explanatory notes on the technical functioning of different CDS types (e.g., distinguishing between CDS on corporate or sovereign bonds, indices and asset-backed securities) and on the fund's CDS strategies. Although extensive information is provided, no new insights are generated regarding the strategic use of CDS, as previously criticized by the SEC.

Moreover, it is often directly (or indirectly) stated that CDS are priced according to the mark to market standard, although the potential obligations amount to the notional value for sold CDS. However, funds can mention the latter information in the footnotes of the respective portfolio holdings or in the notes, while not necessarily giving the overall notional amount of short CDS. For example, starting in 2009, Fidelity funds mention that the notional amount describes the highest potential loss that can occur due to sold CDS as well as provide an absolute amount and a fraction of the net asset value put at risk during a specific period (see the **Appendix**). The figures were in line with disclosed CDS notional amounts observed in the data. Additionally, since the second half of 2009, Fidelity Funds give the precise amount of net collateral pledged as well as the amount that should be paid beyond that point (assuming all contracts are triggered).[42] This last piece of information is only provided by some funds within the notes, while other funds usually mention the amount of collateral pledged of the respective positions in the footnotes to the portfolio holdings.

Overall, the previous analyses reveal that fund comments could be improved in the interest of the investors. For example, it seems to be useful if funds provide information about derivative use and possible consequences within the performance discussion at the beginning of the reports in addition

[42] The 2010 semi-annual report for Fidelity Intermediate Bond Fund states: "The total notional amount of all credit default swaps open at period end where the Fund is the seller of protection amounted to $4,324 representing 0.1% of net assets. Credit default swaps are considered to have credit-risk contingent features since they require payment by the seller of protection to the buyer of protection upon the occurrence of a defined credit event. The total value of credit default swaps in a net liability position as of period end was $(3,656). The value of assets posted as collateral, net of assets received as collateral, for these swaps was $2,907. If a defined credit event had occurred as of period end for swaps in a net liability position, the swaps' credit-risk-related contingent features would have been triggered and the Fund would have been required to pay $4,324, less the value of the swaps' related reference obligations." Report (Notes), p. 34-35.

to the notes section. Reducing and standardizing the very extensive CDS related comments, e.g., regarding the details about the functioning of CDS from contract initiation to termination could also be a valuable improvement. Avoiding the use of unspecific statements about a fund's CDS related strategies could also benefit investors because funds only pursuing short CDS strategies (for non-hedging purposes) often – intentionally or unintentionally – report to use long and short CDS for a wider range of purposes. Furthermore, mentioning the highest aggregate notional amount that could be due in a specific period because of sold CDS (as a fraction of the TNA) as well as the precise amount of net collateral pledged and additional necessary payments if all contracts are triggered within the notes might be an improvement for a potential investor. The existence and mandatory application of a compact and standardized template for CDS related text that incorporates the above features, which are already required by law, could increase understanding, and the value of information.

Altogether, these results confirm many former SEC findings (SEC Letter to the GCotICI (2010)) with regard to the lengthy, highly technical, and unspecific disclosure policies of mutual funds. They further highlight that the disclosures of U.S. funds and public companies (e.g., Beretta and Bozzolan (2004), Lajili and Zeghal (2005), CFA Reports (2011) and (2013)) similarly lack uniformity, clarity, and overemphasize quantity over quality of reporting. Although there is a lot of information given, the value of this information for the reader should be evaluated by further research and regulators.

5.3.2 The Nature of CDS Related Comments Disclosed by German Funds

Opposed to U.S. fund reports, the public reports of German funds contain only a brief description of a fund's investment strategy during the specific period and occasionally whether CDS are used for "hedging" and/or "investment purposes" (e.g., for synthesizing a bond or for speculating). From an investor's perspective, it is important to know whether German funds that voluntarily comment on their CDS holdings do so truthfully. For the sample of German funds, only 9 out of the 19 that used CDS directly commented on CDS use in 25 out of 106 half-years (23.58%). As shown in **Figure 8**, the number of funds commenting on CDS use increased from 1 fund in the second half of 2006 to 6 funds in 2010. Four funds that used CDS suggest that they never used credit derivatives.

As reported in **Table 10**, German funds that commented on CDS use had significantly higher CDS holdings (as related to a fund's TNA) at the end of reporting period than funds that did not comment on CDS. In particular, the short CDS positions are significantly higher for funds that commented on CDS use, indicating that the funds that were higher exposed to risk provided additional information to investors. However, comments were not always in line with the disclosed CDS holdings: **Figure 8**

shows that 3 out of 9 funds suggested hedging with CDS in 8 out of 25 (32%) half-years, while pursuing both long and short CDS strategies for a wider range of purposes. In all of these cases, short CDS positions were always high and, in 6 cases, even significantly outweighed long CDS positions at the respective period ends. This indicates a heightened fund exposure to risk, whereas the funds reported to hedge with CDS. These misleading statements are summarized in **Table 11**, where the 8 misleading CDS comments (author's translation) are compared to relevant CDS holdings on the particular reporting date. By looking at the comments around the highlighted periods, I found that they differed from those highlighted as misleading (not reported). Additionally, although these 3 funds stopped commenting on CDS use, they did not stop using CDS (2 of the 3 funds also used CDS before they started to comment on them for the first time). For those particular cases, one cannot rule out the possibility that funds intentionally wanted to misguide investors.

By contrast, U.S. funds that did not use long CDS often reported to buy and sell CDS for a wider range of purposes in 53 out of 192 half-years. In Germany, only 2 out of the 9 funds that did not use long CDS stated to buy and sell CDS for a wider range of purposes in 2 out of 25 half-years. By contrast, for funds that did not have short CDS, i.e., pursued long CDS strategies, 2 out of 9 stated to buy and sell CDS in 3 out of 25 half-years for a wider range of purposes (in the U.S., 7 out of 192 half-years). Moreover, one fund stated to only use short CDS (associated with non-hedging purposes) even though it used long CDS positions in 2 half-years. Only one fund stated and actually used long CDS in 2 half-years. In total, German funds made 8 misleading statements and could have been more specific about their CDS strategies in 7 additional cases out of 25 half-years (in the U.S., the issue of unspecific comments occurred in 60 out of 192 half-years). The comments in the extended prospectuses (terms of contract) were also very general or strictly followed the wording of the law. Thus, based on the report comments on derivatives, investors could have only guessed about the way funds distributed in Germany used financial instruments during this time period. All proposals for improvements to U.S fund disclosure policies made in the previous subsection should also be considered by regulators for EU-wide fund disclosure policies.

Although different levels of transparency with respect to the information provided to investors are observable in both countries, analyses performed for U.S. and German corporate bond funds show the high level of flexibility that funds have when commenting on their derivative strategies, which may misguide investors. The results suggest that investors have to analyze portfolio holdings in order to learn about the true investment behavior of funds because CDS comments are often unspecific or misleading. In the interest of investors around the world (particularly unsophisticated ones), who

expect a high level of protection from regulation, U.S. and German/EU regulators should monitor the investment and disclosure strategies pursued by mutual funds more intensively.

6 Conclusion

This study analyzes the level of potential losses from CDS holdings at U.S. and German corporate bond funds together with the CDS related disclosures during the financial crisis of 2007-2009 under the regulation existing at that time. In particular, I investigate whether the potential risks associated with the use of CDS are properly reflected in the information provided to investors in the annual and semi-annual reports of funds in the U.S. and Germany. The goal is to determine whether investors need to worry about funds potentially taking extensive risks through the use of CDS and misinforming the public about their CDS policies. From prior research (e.g., Gałkiewicz (2014)), it is known that funds in the U.S. and Germany face high levels of flexibility. Depending on the types of derivatives used, funds in both countries can reach a point at which default is theoretically possible solely due to their investments into derivatives, e.g., by investing into short CDS with a notional amount equal to (and in Germany/the EU even higher than) the value of a fund's net assets.

In general, CDS use was extensive and increased over time for both U.S. and German funds between 2004 and 2010. Although less experienced in using CDS, German funds had higher and more varying CDS positions on the individual fund level since 2007. Especially noticeable is the fact that U.S. and German funds stayed net short and kept the highest levels of CDS selling protection during the middle of the financial crisis and thus, likely further increased their overall risk during this time period. For some funds in the U.S., the potential for realizing losses via CDS selling protection, as determined by the sum of notional amounts (following U.S. law), was almost as high as a fund's TNA, while in Germany, this potential was sometimes even higher than a fund's TNA. Thus, funds are able to circumvent the direct leverage restrictions, which limit bank borrowing to 10% and 33.3% of TNA in Germany/the EU and the U.S., respectively, by using derivatives, such as CDS, and inflate overall leverage to levels that lie above the value of net assets. This is cause for concern as the high level of flexibility was not originally envisaged by regulators and might not be in the best interest of investors. Although definite conclusions about speculation require the portfolio holdings of funds, this study shows that the prevalent regulation might not sufficiently protect investors from extreme losses.

The additional analysis of the CDS trading activity of German funds between two consecutive reporting dates highlights that the purchases and sales of CDS observable from one period-end to the next explain approximately one third of the aggregate CDS purchases or sales implied by period-end and within-period data. In this regard, a high level of heterogeneity across funds is observable. This

suggests that period-end data overlooks many round-trip CDS trades (purchases followed by sales or the other way around) undertaken by management.

Regarding the analysis of information funds provide about their CDS use, the results suggest that investors have to analyze portfolio holdings in order to learn about the true investment behavior of funds in both countries because comments on CDS contained in the periodic reports are often unspecific and even sometimes misleading. For instance, in Germany, funds that sold more CDS protection than they bought often stated to only buy CDS protection for hedging purposes.

Based on the aforementioned results, it seems advisable that regulators in both countries tighten rules restricting the speculative use of derivatives by funds to a reasonable level, as well as implement more standardized disclosure policies. Stronger restrictions on the speculative use of derivatives would not affect the majority of U.S. or German funds, but could benefit the mutual fund industry as a whole by preventing potentially high, and long-lasting, losses due to outliers. Overall, the analyses presented document potential limitations of mutual fund regulation in the U.S. and Germany/the EU with respect to CDS and highlight the existence of high risks. Given the potential harmful impacts on investors, as witnessed during the financial crisis, these findings are of significant importance for regulators and investors alike.

Appendix

An example of CDS related comments in a U.S. fund report

The following Quote presents an excerpt from the notes part of the annual report from August 31, 2010 of the Fidelity Intermediate Bond Fund:

“The Fund entered into credit default swaps as a seller to gain credit exposure to an issuer and/or as a buyer to provide a measure of protection against defaults of an issuer. The issuer may be either a single issuer or a "basket" of issuers. Periodic payments are made over the life of the contract provided that no credit event occurs. For credit default swaps on most corporate and sovereign issuers, credit events include bankruptcy, failure to pay, obligation acceleration or repudiation/moratorium. For credit default swaps on asset-backed securities, a credit event may be triggered by events such as failure to pay principal, maturity extension, rating downgrade or write-down. For credit default swaps on asset-backed securities, the reference obligation described represents the security that may be put to the seller. As a seller, if an underlying credit event occurs, the Fund will either pay the buyer an amount equal to the notional amount of the swap and take delivery of the reference obligation or underlying securities comprising an index or pay a net settlement amount of cash equal to the notional amount of the swap less the recovery value of the reference obligation or underlying securities comprising an index. The notional amount of credit default swaps is included in the Schedule of Investments and approximates the maximum potential amount of future payments that the Fund could be required to make if the Fund is the seller and a credit event were to occur. The total notional amount of all credit default swaps open at period end where the Fund is the seller amounted to $3,990 representing .08% of net assets." Report (Notes), p. 36-37

Figure 1: The development of the number of U.S. and German corporate bond funds reporting the use of CDS between 2004 and 2010

This figure shows the development of the number of U.S. (US) and German (DE) corporate bond funds that report using CDS at period end and the number of German funds that report using CDS within period between 2004 and 2010. Out of the 30 funds from each country (60 total), 19 funds report using CDS at some point between 2004 and 2010 – 192 times in the U.S. and 106 times in Germany. Additionally, 13 German funds report using CDS occurring within period at some point in the time between 2004 and 2010 (for a total of 57 times). Source: CRSP, BVI, SEC, Bundesanzeiger.

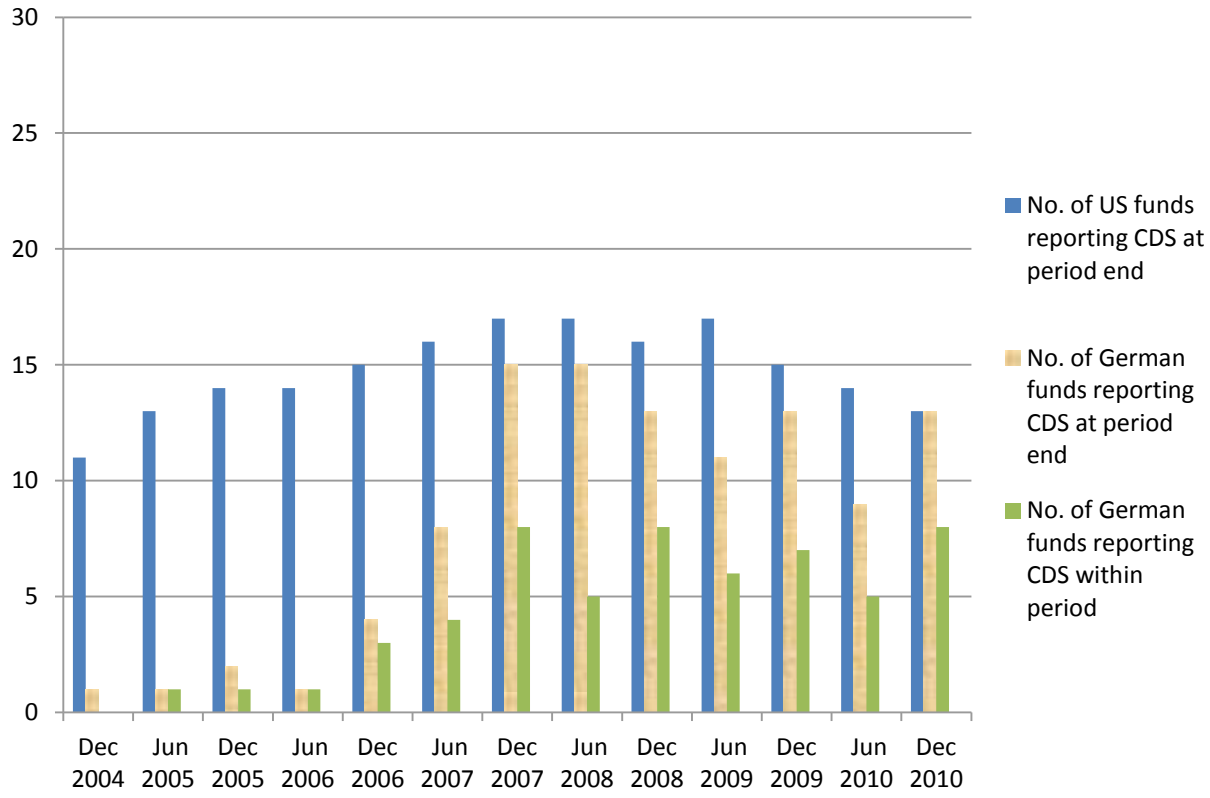

Figure 2: The development of total CDS positions of U.S. and German funds that report using CDS between 2004 and 2010

This figure shows the average total notional amount of all CDS outstanding divided by total net assets at a particular period end for U.S. and German corporate bond funds. The respective median (md) positions are represented by dotted lines. Source: CRSP, BVI, SEC, Bundesanzeiger.

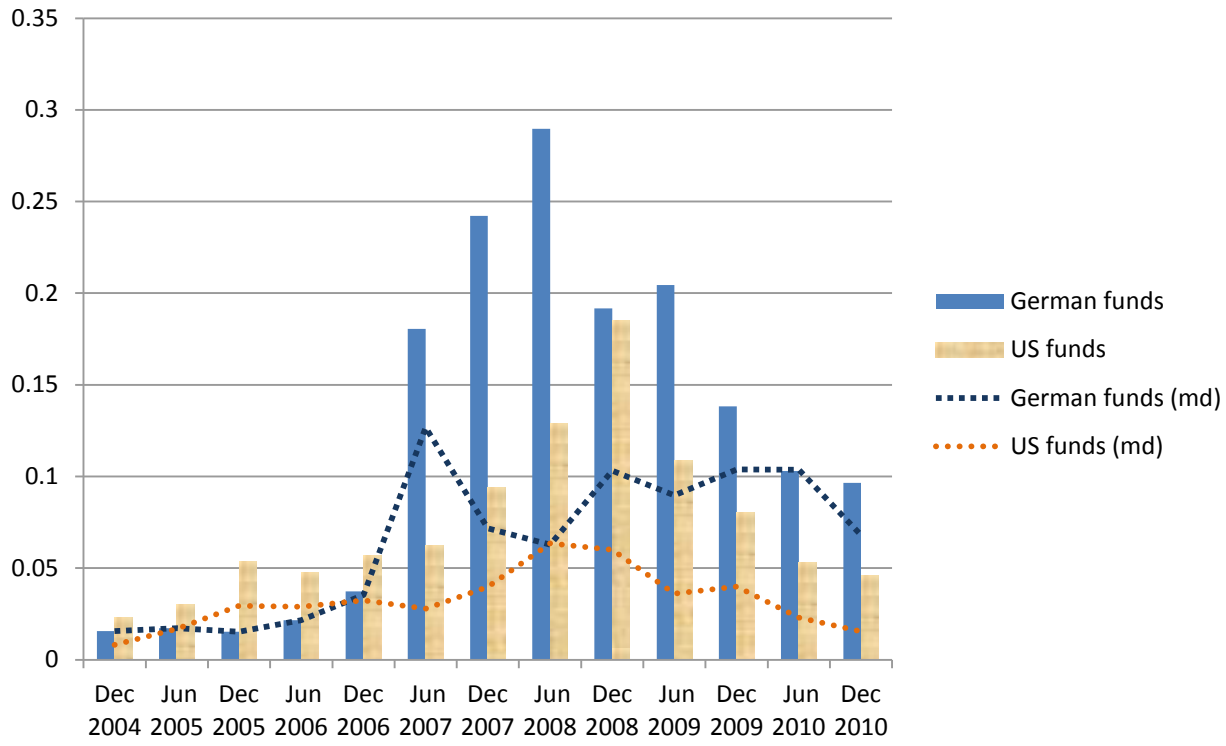

Figure 3: The development of long and short CDS positions of U.S. and German corporate bond funds between 2004 and 2010

This figure shows the development of the average CDS long and short positions at a particular period end for U.S. and German funds. CDS notional amounts are normalized by the fund's total net asset value (TNA). The respective median (md) positions are represented by dotted lines.

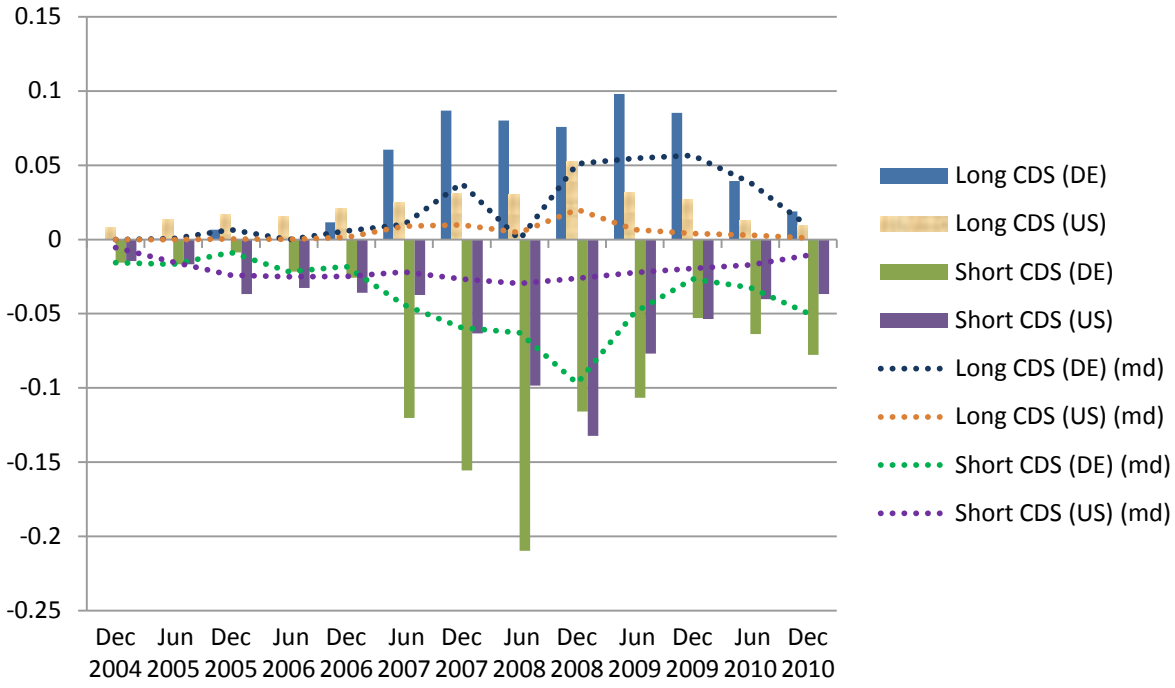

Figure 4: The development of the net CDS positions of U.S. and German corporate bond funds and the credit risk premium

This figure presents the development of the average CDS net notional positions (long CDS – short CDS) as a fraction (frac.) of a fund's TNA for U.S. and German CDS users and the level of the general credit risk premium represented by BBB yield – Treasury yield between 2004 and 2010 at a particular period end. The respective median (md) positions are represented by dotted lines.

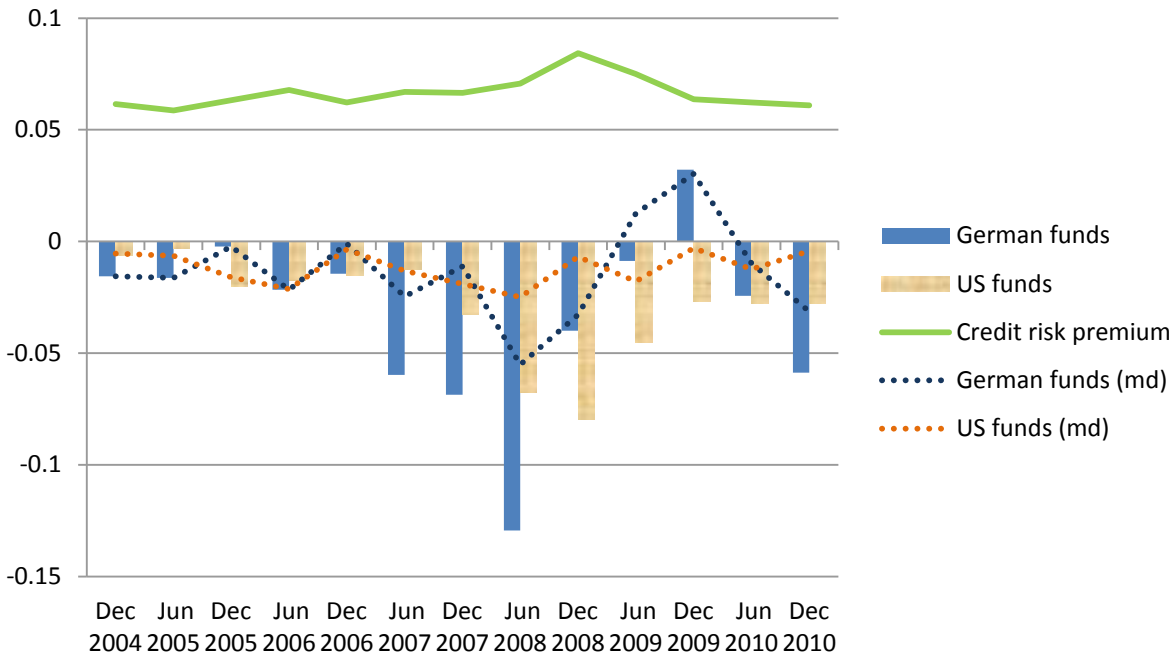

Figure 5: The development of long and short CDS positions and half-year returns of Deka-CorporateBond Euro (top30de fund no. 30)

This figure shows the development of the Deka-CorporateBond Euro fund's CDS long and short positions at a particular period end together with its half-year returns between 2004 and 2010. CDS notional amounts are normalized by the fund's total net assets.

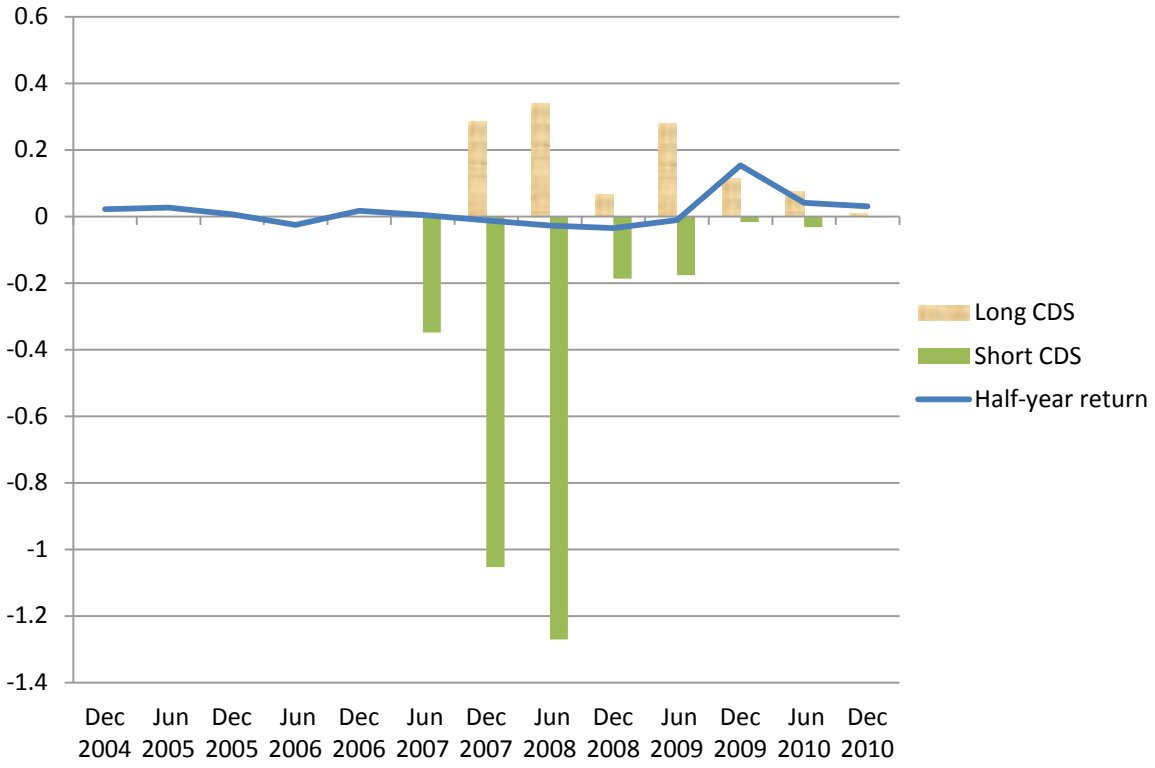

Figure 6: The development of long and short CDS positions and half-year returns of Putnam Diversified Income Trust (top30us fund no. 14)

This figure shows the development of the Putnam Diversified Income Trust's CDS long and short positions at a particular period end together with its half-year returns between 2004 and 2010. CDS notional amounts are normalized by the fund's total net assets.

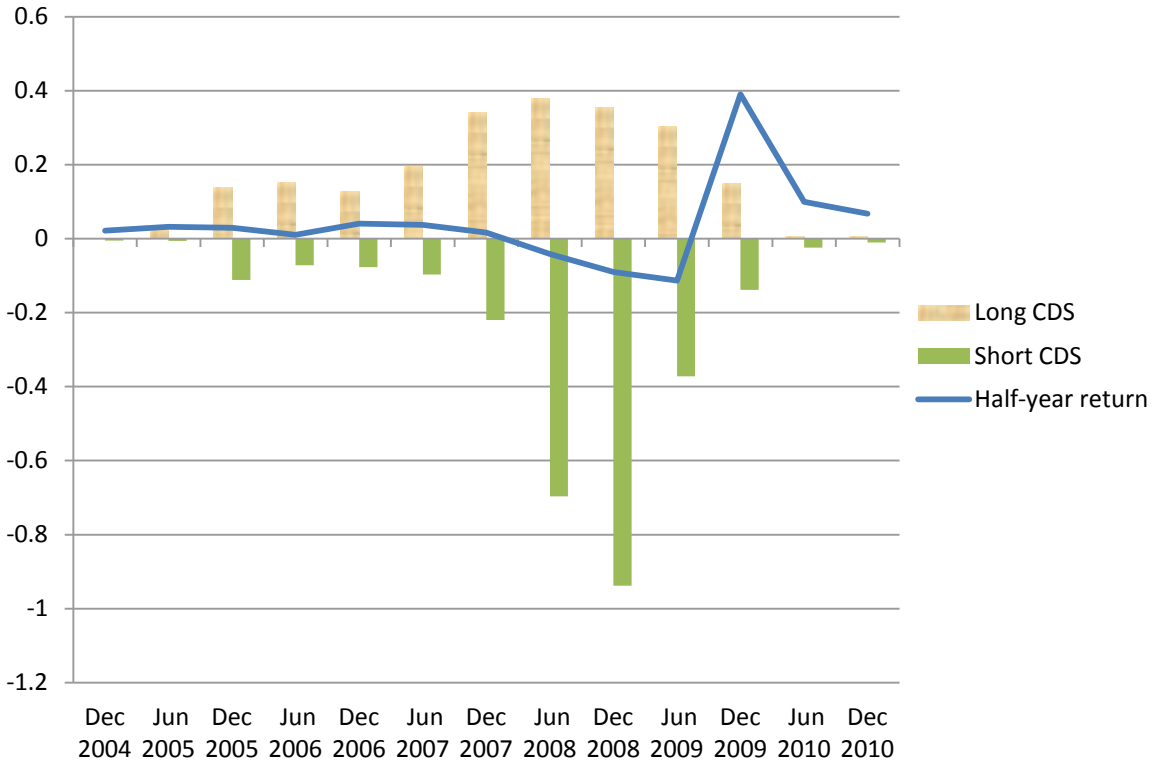

Figure 7: The development of the median number of missing CDS trades of German funds over time

This figure shows the development of the median number of missing CDS trades as a fraction of aggregate CDS of German funds that report using CDS within period between 2004 and 2010.

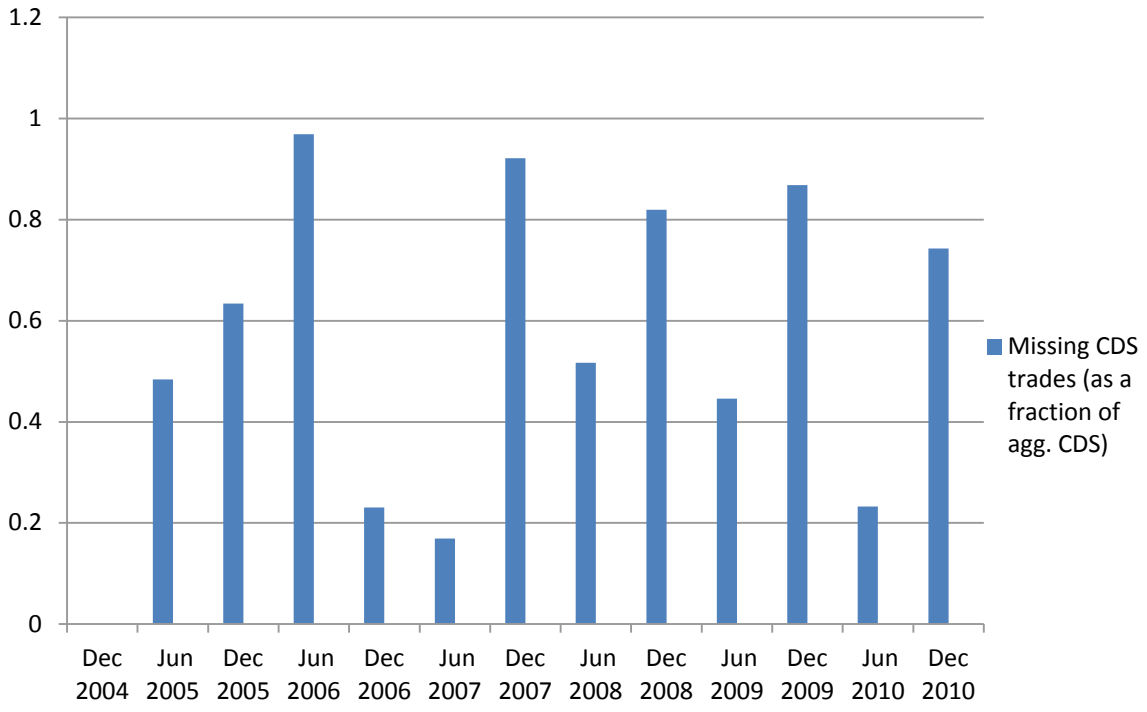

Figure 8: The development of the number of CDS comments and misleading CDS comments of German funds between 2004 and 2010

This figure shows the development of the number of CDS comments and misleading CDS comments of German funds reporting CDS at period end between 2004 and 2010.

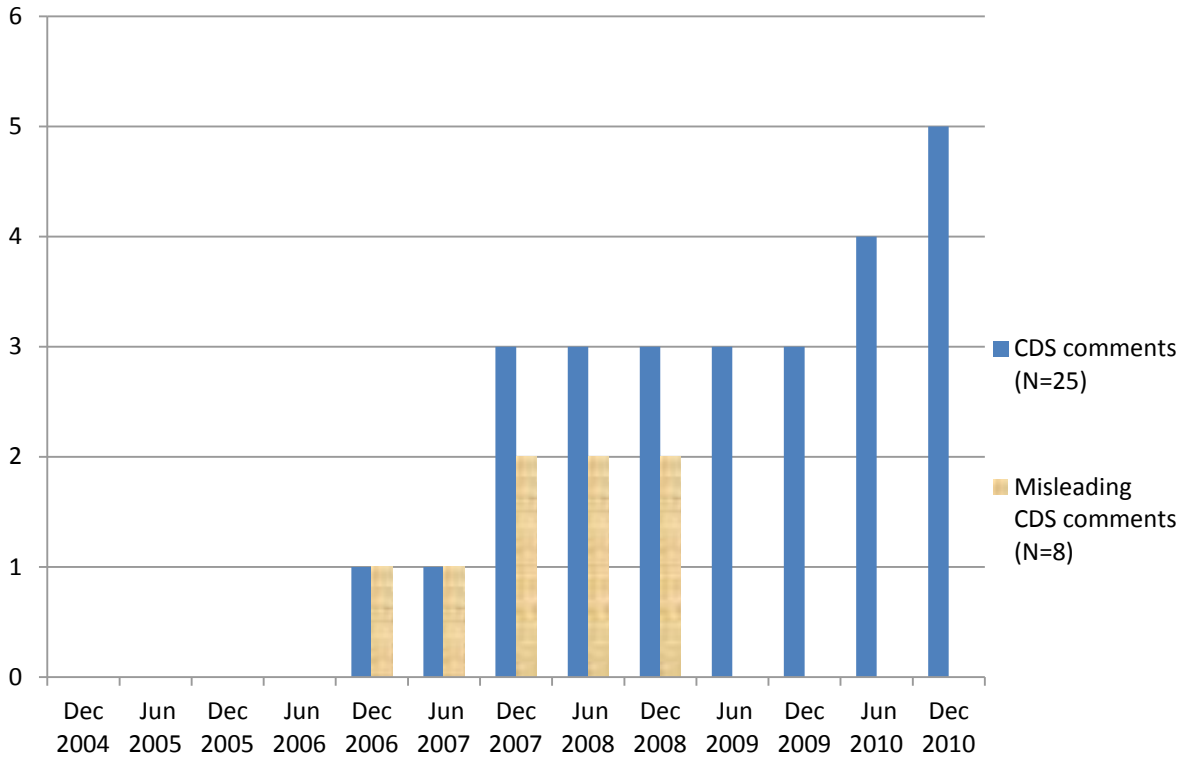

Table 1: The largest U.S. funds (top30us) as measured by TNA on June 30, 2004 (CRSP)

No.	Fund family name: Fund name	TNA in mio. $
1	PIMCO Funds: Pacific Investment Management Series: Total Return Fund	73,202.1
2	Vanguard Fixed Income Securities Funds: Vanguard Short-Term Corporate Fund	17,751.5
3	Bond Fund of America, Inc	17,620.6
4	PIMCO Funds: Pacific Investment Management Series: Low Duration Fund	14,469.9
5	American High-Income Trust	8,895.6
6	Vanguard Fixed Income Securities Funds: Vanguard High-Yield Corporate Fund	8,743.3
7	Lord Abbett Bond-Debenture Fund, Inc	8,211.8
8	Pioneer High Yield Fund, Inc	7,664.5
9	Fidelity Commonwealth Trust: Fidelity Intermediate Bond Fund	6,774.7
10	PIMCO Funds: Pacific Investment Management Series: High Yield Fund	6,759.0
11	Dodge & Cox Income Fund	6,629.0
12	Oppenheimer Strategic Funds Trust: Oppenheimer Strategic Income Fund	6,181.8
13	Fidelity Fixed-Income Trust: Fidelity Investment Grade Bond Fund	5,732.3
14	Putnam Diversified Income Trust	5,533.0
15	Fidelity Fixed-Income Trust: Fidelity Short-Term Bond Fund	5,044.6
16	Intermediate Bond Fund of America	5,039.4
17	Evergreen Select Fixed Income Trust: Evergreen Core Bond Fund	4,517.3
18	Vanguard Fixed Income Securities Funds: Vanguard Long-Term Corporate Fund	4,444.0
19	Vanguard Fixed Income Securities Funds: Vanguard Intermediate-Term Corporate Fund	4,225.9
20	MainStay Funds: MainStay High Yield Corporate Bond Fund	4,225.7
21	Fidelity Summer Street Trust: Fidelity Capital & Income Fund	4,148.9
22	SEI Institutional Managed Trust: Core Fixed Income Portfolio	3,949.2
23	T Rowe Price High Yield Fund, Inc	3,897.0
24	Western Asset Funds, Inc: Western Asset Core Plus Bond Portfolio	3,431.0
25	Putnam High Yield Trust	2,938.0
26	Franklin High Income Trust: AGE High Income Fund	2,849.0
27	AXP Diversified Bond Fund, Inc	2,816.7
28	Fidelity Fixed-Income Trust: High Income Fund	2,785.9
29	Calvert Fund: Calvert Income Fund	2,776.5
30	Sanford C Bernstein Fund, Inc: Intermediate Duration Portfolio	2,691.1

Table 2: The largest German funds (top30de) as measured by TNA on December 31, 2004 (BVI)

No.	Fund family name: Fund name	TNA in mio. $
1	Allianz GI Lux: dit-Euro Bond Total Return	6,303.1
2	DEKA: RenditDeka	6,166.6
3	DWS: DWS Vermögensbildungsfonds R	4,521.0
4	ACTIVEST LUXEMBOURG S.A.: Activest TotalReturn	3,521.7
5	DWS: DWS Select-Rent	2,837.4
6	DIT: dit-Allianz Rentenfonds	2,707.2
7	DIT: DIT-EURO RENTENFONDS >>K<<	2,662.3
8	UIL S.A.: UniEuroKapital Corporates A	1,855.3
9	DWS S.A.: DWS Euro-Bonds (Medium)	1,817.1
10	GERLING INVESTMENT: Gerling Rendite Fonds	1,680.1
11	DekaLux-Bond	1,451.4
12	DWS S.A.: DWS Euro-Corp Bonds	1,449.5
13	DIT: dit-Allianz Mobil-Fonds	1,425.4
14	UNION S.A.: UniEuroRenta Corporates	1,263.8
15	UNION S.A.: UniPlusKapital DM (Lux)	1,254.4
16	DEKA: DekaTresor	997.2
17	Ring-Rentenfonds DWS	921.9
18	DIT-EURO RENTENFONDS	919.4
19	MEAG EuroRent	875.6
20	UIP: UniEuroRenta	873.5
21	DWS Inrenta	840.5
22	DWS Invest Euro Bonds (Short) FC	761.1
23	DWS Euro-Bonds (Short)	747.4
24	Union Investment Lux.: UniEuroKapital II	746.7
25	UIP: UniEuroRenta Absolute Return	710.5
26	WestAM: Mundo I Invest	709.7
27	MEAG ProRent	702.5
28	FRANKFURT-TRUST: Basis-Fonds I	664.0
29	DWS Euro-Bonds (Long)	596.4
30	Deka-CorporateBond Euro	591.8

Table 3: Summary statistics

This table reports summary statistics for the total net asset value (TNA), CDS notional (sum of long and short positions), long CDS notional, short CDS notional, CDS net notional (long – short positions), and the unrealized value change in mio. $ of German and U.S. funds that reported using CDS in a particular half-year between 2004 and 2010. 19 out of the 30 U.S. funds report using CDS 192 times, and 19 out of the 30 German funds report using CDS 106 times.

Country	Variable	N	mean	sd	min	p25	p50	p75	max
Germany	TNA (in mio. $)	106	1,627	1,928	239	673	1,002	1,600	10,383
	CDS notional (in mio. $)	106	175	230	1	42	96	230	1,383
	Long CDS notional (in mio. $)	106	75	161	0	0	33	99	1,169
	Short CDS notional (in mio. $)	106	100	123	0	15	59	141	562
	CDS net notional (in mio. $)	106	-25	172	-458	-94	-17	23	1,079
	Unrealized value change (in mio. $)	106	0	3	-8	-1	0	0	14
	CDS use	106	1	0					
USA	TNA (in mio. $)	192	16,076	34,457	781	4,515	7,005	10,134	252,184
	CDS notional (in mio. $)	192	1,181	3,657	1	62	221	668	33,778
	Long CDS notional (in mio. $)	192	289	1,001	0	0	17	163	11,118
	Short CDS notional (in mio. $)	192	893	2,937	0	32	156	483	31,059
	CDS net notional (in mio. $)	192	-604	2,425	-28,341	-358	-88	-4	393
	Unrealized value change (in mio. $)	192	-25	127	-1,172	-8	0	1	252
	CDS use	192	1	0					
Total	TNA (in mio. $)	298	10,936	28,511	239	1,331	4,624	7,760	252,184
	CDS notional (in mio. $)	298	823	2,975	1	52	149	405	33,778
	Long CDS notional (in mio. $)	298	212	815	0	0	22	125	11,118
	Short CDS notional (in mio. $)	298	611	2,387	0	21	102	303	31,059
	CDS net notional (in mio. $)	298	-398	1,967	-28,341	-225	-38	1	1,079
	Unrealized value change (in mio. $)	298	-16	102	-1,172	-3	0	0	252
	CDS use	298	1	0					

Table 4: Summary statistics

This table reports summary statistics for CDS notional (sum of long and short positions), long CDS notional, short CDS notional, CDS net notional (long – short positions), and the unrealized value change as a fraction of a fund's total net asset value (TNA) (in %) of German and U.S. funds that report using CDS in a particular half-year between 2004 and 2010. 19 out of the 30 U.S. funds report using CDS 192 times, and 19 out of the 30 German funds report using CDS 106 times.

Country	Variable	N	mean	sd	min	p25	p50	p75	max
Germany	CDS notional (in % of TNA)	106	17.33%	25.05%	0.05%	2.96%	7.86%	21.75%	160.89%
	Long CDS notional (in % of TNA)	106	6.43%	9.12%	0.00%	0.00%	1.93%	10.37%	41.04%
	Short CDS notional (in % of TNA)	106	10.91%	18.50%	0.00%	1.38%	5.09%	12.16%	127.04%
	CDS net notional (in % of TNA)	106	-4.48%	14.94%	-93.19%	-7.49%	-1.46%	2.18%	21.22%
	Unrealized value change (in % of TNA)	106	-0.10%	0.28%	-1.63%	-0.11%	-0.03%	0.00%	0.50%
USA	CDS notional (in % of TNA)	192	7.84%	15.75%	0.02%	0.87%	2.95%	7.67%	129.09%
	Long CDS notional (in % of TNA)	192	2.37%	5.65%	0.00%	0.00%	0.36%	2.18%	37.71%
	Short CDS notional (in % of TNA)	192	5.47%	11.12%	0.00%	0.48%	2.03%	5.96%	93.82%
	CDS net notional (in % of TNA)	192	-3.10%	7.95%	-58.54%	-3.51%	-1.32%	-0.08%	11.92%
	Unrealized value change (in % of TNA)	192	-0.25%	0.83%	-8.10%	-0.16%	0.00%	0.01%	0.68%
Total	CDS notional (in % of TNA)	298	11.21%	20.05%	0.02%	1.50%	4.17%	10.96%	160.89%
	Long CDS notional (in % of TNA)	298	3.81%	7.33%	0.00%	0.00%	0.50%	3.60%	41.04%
	Short CDS notional (in % of TNA)	298	7.40%	14.40%	0.00%	0.73%	2.50%	7.55%	127.04%
	CDS net notional (in % of TNA)	298	-3.59%	10.95%	-93.19%	-4.97%	-1.40%	0.05%	21.22%
	Unrealized value change (in % of TNA)	298	-0.19%	0.69%	-8.10%	-0.14%	-0.01%	0.01%	0.68%

Table 5: T-test for differences in means of CDS holdings of U.S. and German funds

This table reports the results of the t-test for differences in means of CDS holdings of U.S. and German bond funds that report using CDS in a particular half-year between 2004 and 2010. Panel A provides results for the following variables: CDS notional (sum of long and short positions), long CDS notional, short CDS notional, CDS net notional (long – short positions), and the unrealized value change expressed in absolute dollar terms, while Panel B reports results for the same variables expressed as a fraction of a fund's total net asset value (TNA). The last column reports p-values of Levene's test for the equality of group variances. *, **, and *** indicate statistical significance at the 10%, 5%, 1% level. Standard errors are presented in brackets.

Variable	German funds	U.S. funds	Difference	(d_se)	Levene's test (p-value)
Panel A: Variables in mio. $					
TNA (in mio. $)	1,626.6800	16,076.2200	-14,449.5400***	(2493.7600)	(0.0000)
CDS notional (in mio. $)	174.6153	1,181.0810	-1,006.465***	(246.8322)	(0.0000)
Long CDS notional (in mio. $)	74.6085	288.5282	-213.9197***	(73.9182)	(0.0003)
Short CDS notional (in mio. $)	100.0068	892.5524	-792.5456***	(212.2812)	(0.0000)
CDS net notional (in mio. $)	-25.3983	-604.0242	578.6259***	(175.8362)	(0.0007)
Unrealized value change (in mio. $)	-0.4031	-24.5986	24.1955***	(9.1378)	(0.0000)
Panel B: Variables as a frac. of TNA					
CDS notional (as a frac. of TNA)	0.1733	0.0784	0.0950***	(0.0269)	(0.0000)
Long CDS notional (as a frac. of TNA)	0.0643	0.0237	0.0406***	(0.0097)	(0.0000)
Short CDS notional (as a frac. of TNA)	0.1091	0.0547	0.0544***	(0.0197)	(0.0003)
CDS net notional (as a frac. of TNA)	-0.0448	-0.0310	-0.0138	(0.0156)	(0.0000)
Unrealized value change (as a frac. of TNA)	-0.0010	-0.0024	0.0014**	(0.0007)	(0.0012)

Table 6: Summary statistics for individual top30us funds listed in Table 1

This table reports summary statistics for short CDS notional and CDS net notional (long – short positions) as a fraction of a fund's total net asset value (in %) of U.S. funds that report using CDS in a particular half-year between 2004 and 2010.

Top30us	Variable	N	mean	sd	p50	p75	max	Variable	N	mean	sd	p50	min	max
1	Short CDS (in % of TNA)	13	4.99%	3.69%	4.80%	7.14%	12.32%	Net notional (in % of TNA)	13	-3.03%	3.45%	-1.61%	-11.24%	0.09%
2	Short CDS (in % of TNA)	13	1.15%	0.71%	1.35%	1.54%	2.31%	Net notional (in % of TNA)	13	-0.97%	0.94%	-1.35%	-2.31%	0.42%
4	Short CDS (in % of TNA)	13	5.31%	3.76%	3.90%	7.96%	13.19%	Net notional (in % of TNA)	13	-4.66%	3.65%	-3.08%	-13.11%	-0.42%
7	Short CDS (in % of TNA)	4	0.17%	0.13%	0.20%	0.27%	0.27%	Net notional (in % of TNA)	4	-0.04%	0.17%	0.00%	-0.27%	0.13%
9	Short CDS (in % of TNA)	13	1.69%	1.14%	1.79%	2.51%	3.66%	Net notional (in % of TNA)	13	-1.69%	1.14%	-1.79%	-3.66%	-0.08%
10	Short CDS (in % of TNA)	13	8.89%	4.51%	9.22%	11.94%	15.69%	Net notional (in % of TNA)	13	-6.57%	3.73%	-7.06%	-12.44%	0.23%
12	Short CDS (in % of TNA)	11	4.36%	4.61%	2.28%	10.42%	11.56%	Net notional (in % of TNA)	11	-1.86%	5.48%	-0.03%	-10.28%	6.33%
13	Short CDS (in % of TNA)	13	2.51%	1.28%	2.67%	2.96%	5.42%	Net notional (in % of TNA)	13	-1.82%	1.63%	-1.52%	-5.37%	0.42%
14	Short CDS (in % of TNA)	13	21.30%	29.08%	9.72%	22.01%	93.82%	Net notional (in % of TNA)	13	-4.60%	19.50%	1.11%	-58.54%	11.92%
15	Short CDS (in % of TNA)	13	1.96%	2.75%	1.70%	2.09%	10.57%	Net notional (in % of TNA)	13	-1.93%	2.73%	-1.70%	-10.50%	-0.02%
17	Short CDS (in % of TNA)	5	3.24%	2.59%	3.26%	5.33%	6.26%	Net notional (in % of TNA)	5	-0.06%	6.71%	-2.02%	-5.80%	11.11%
18	Short CDS (in % of TNA)	4	5.51%	0.94%	5.18%	6.04%	6.89%	Net notional (in % of TNA)	4	-5.40%	0.92%	-5.08%	-6.74%	-4.69%
19	Short CDS (in % of TNA)	13	0.36%	0.20%	0.37%	0.49%	0.73%	Net notional (in % of TNA)	13	-0.22%	0.12%	-0.20%	-0.39%	-0.03%
22	Short CDS (in % of TNA)	11	1.82%	1.49%	1.93%	2.73%	4.95%	Net notional (in % of TNA)	11	0.22%	1.11%	-0.01%	-2.08%	1.76%
23	Short CDS (in % of TNA)	8	0.46%	0.30%	0.43%	0.64%	0.97%	Net notional (in % of TNA)	8	-0.36%	0.52%	-0.43%	-0.97%	0.80%
24	Short CDS (in % of TNA)	13	22.37%	16.95%	16.77%	30.25%	61.66%	Net notional (in % of TNA)	13	-16.35%	16.22%	-12.71%	-54.46%	0.62%
25	Short CDS (in % of TNA)	11	1.73%	1.35%	1.86%	2.92%	3.79%	Net notional (in % of TNA)	11	-1.24%	1.31%	-0.54%	-3.43%	-0.01%
27	Short CDS (in % of TNA)	5	0.09%	0.15%	0.00%	0.10%	0.36%	Net notional (in % of TNA)	5	0.42%	0.35%	0.51%	0.00%	0.75%
30	Short CDS (in % of TNA)	3	0.95%	1.64%	0.00%	2.84%	2.84%	Net notional (in % of TNA)	3	1.19%	3.50%	2.84%	-2.84%	3.56%
Total	Short CDS (in % of TNA)	192	5.47%	11.12%	2.03%	5.96%	93.82%	Net notional (in % of TNA)	192	-3.10%	7.95%	-1.32%	-58.54%	11.92%

Table 7: Summary statistics for individual top30de funds listed in Table 2

This table reports summary statistics for short CDS notional, and CDS net notional (long – short positions) as a fraction of a fund's total net asset value (in %) of German funds that report using CDS in a particular half-year between 2004 and 2010.

Top30de	Variable	N	mean	sd	p50	p75	max	Variable	N	mean	sd	p50	min	max
1	Short CDS (in % of TNA)	13	7.75%	10.52%	2.40%	7.55%	36.66%	Net notional (in % of TNA)	13	-0.93%	13.99%	-0.74%	-34.87%	20.18%
2	Short CDS (in % of TNA)	8	1.01%	0.94%	1.24%	1.50%	2.58%	Net notional (in % of TNA)	8	2.69%	3.37%	3.90%	-2.58%	6.12%
3	Short CDS (in % of TNA)	1	0.00%	.	0.00%	0.00%	0.00%	Net notional (in % of TNA)	1	3.78%	.	3.78%	3.78%	3.78%
4	Short CDS (in % of TNA)	1	1.23%	.	1.23%	1.23%	1.23%	Net notional (in % of TNA)	1	-1.23%	.	-1.23%	-1.23%	-1.23%
5	Short CDS (in % of TNA)	2	1.58%	0.21%	1.58%	1.73%	1.73%	Net notional (in % of TNA)	2	-1.58%	0.21%	-1.58%	-1.73%	-1.44%
6	Short CDS (in % of TNA)	6	7.95%	5.45%	5.59%	12.95%	16.41%	Net notional (in % of TNA)	6	-5.95%	6.12%	-5.37%	-14.76%	3.03%
7	Short CDS (in % of TNA)	6	3.47%	2.27%	3.37%	5.44%	6.60%	Net notional (in % of TNA)	6	-3.47%	2.27%	-3.37%	-6.60%	-0.90%
8	Short CDS (in % of TNA)	8	15.16%	13.25%	13.45%	23.54%	38.91%	Net notional (in % of TNA)	8	-6.50%	10.80%	-1.26%	-28.21%	1.52%
9	Short CDS (in % of TNA)	7	10.53%	1.27%	10.85%	11.47%	12.16%	Net notional (in % of TNA)	7	-10.53%	1.27%	-10.85%	-12.16%	-8.28%
10	Short CDS (in % of TNA)	1	0.37%	.	0.37%	0.37%	0.37%	Net notional (in % of TNA)	1	-0.37%	.	-0.37%	-0.37%	-0.37%
11	Short CDS (in % of TNA)	7	2.31%	2.38%	1.20%	5.21%	5.40%	Net notional (in % of TNA)	7	3.83%	6.60%	4.26%	-5.40%	10.38%
12	Short CDS (in % of TNA)	7	31.95%	14.24%	37.08%	43.10%	46.91%	Net notional (in % of TNA)	7	-10.34%	17.49%	-14.04%	-27.61%	21.22%
13	Short CDS (in % of TNA)	8	8.08%	8.58%	5.67%	10.13%	27.05%	Net notional (in % of TNA)	8	1.84%	5.57%	2.96%	-8.44%	9.21%
14	Short CDS (in % of TNA)	8	13.30%	14.24%	8.47%	23.22%	39.89%	Net notional (in % of TNA)	8	-3.30%	9.36%	-0.78%	-24.05%	7.22%
16	Short CDS (in % of TNA)	3	1.65%	0.64%	1.47%	2.36%	2.36%	Net notional (in % of TNA)	3	-1.65%	0.64%	-1.47%	-2.36%	-1.12%
18	Short CDS (in % of TNA)	3	5.33%	7.28%	2.36%	13.62%	13.62%	Net notional (in % of TNA)	3	-4.60%	8.13%	-2.36%	-13.62%	2.18%
20	Short CDS (in % of TNA)	4	0.03%	0.05%	0.00%	0.05%	0.11%	Net notional (in % of TNA)	4	1.41%	2.77%	0.08%	-0.07%	5.57%
23	Short CDS (in % of TNA)	5	7.65%	1.63%	7.49%	8.87%	9.69%	Net notional (in % of TNA)	5	-7.65%	1.63%	-7.49%	-9.69%	-5.93%
30	Short CDS (in % of TNA)	8	38.59%	49.58%	18.16%	70.09%	127.04%	Net notional (in % of TNA)	8	-24.04%	40.62%	-5.72%	-93.19%	10.32%
Total	Short CDS (in % of TNA)	106	10.91%	18.50%	5.09%	12.16%	127.04%	Net notional (in % of TNA)	106	-4.48%	14.94%	-1.46%	-93.19%	21.22%

Table 8: Summary statistics for aggregate CDS, CDS turnover and missed trades of German funds from period-end and within-period CDS data

This table reports summary statistics for the differences in CDS notional implied by period-end data, aggregate purchases and sales of CDS, CDS turnover, and missed trades implied by period-end and within-period CDS data of German bond funds. The variable period-end difference in CDS notional (in mio. $) shows the difference in CDS holdings between the present and the past reporting dates. The aggregate sales CDS notional (in mio. $) reflects the aggregate within-period CDS sales reported by funds, while the aggregate purchases CDS notional (in mio. $) presents the aggregate purchases of CDS determined as the sum of the respective period-end difference in CDS notional and aggregate sales CDS notional. The aggregate sales of long CDS (as a fraction of aggregate sales CDS) presents the fraction of the aggregate sales CDS notional explained by aggregate sales of long CDS reported by funds in 43 periods, while the aggregate purchases of long CDS (as a fraction of aggregate purchases CDS) reports the fraction of the aggregate purchases CDS notional explained by the aggregate purchases of long CDS, both of which are scaled by the respective aggregate purchases or sales CDS notional. The CDS turnover ratio (as a fraction of average CDS notional) reflects the minimum of aggregate sales or purchases of CDS scaled by the average present and past period CDS notional of the fund. The missing trades (as a fraction of aggregate CDS) show the fraction of the higher of aggregate sales or purchases of CDS not explained by the period-end difference in CDS notional.

Germany

Variable	N	mean	sd	min	p25	p50	p75	max
Period-end difference in CDS notional (in mio. $)	56	23.5408	183.5515	-577.5111	-20.1476	7.7089	91.4164	818.1523
Aggregate purchases CDS notional (in mio. $)	56	705.1489	1,593.5419	0.5392	43.4869	162.6237	519.4897	8,151.6802
Aggregate purchases of long CDS (as a frac. of agg. purchases CDS)	43	0.4452	0.3623	0.0000	0.0387	0.5353	0.7472	1.0000
Aggregate CDS sales notional (in mio. $)	56	681.6081	1,585.1466	3.9510	26.5422	115.6641	501.2390	8,186.6416
Aggregate sales of long CDS (as a frac. of agg. sales CDS)	43	0.4630	0.3804	0.0000	0.0000	0.5074	0.8095	1.0000
CDS turnover ratio (as a frac. of average CDS notional)	51	6.7317	20.7798	0.0248	0.3997	0.9379	4.2000	140.0000
Missed trades (as a frac. of agg. CDS notional)	56	0.6266	0.3292	0.0205	0.2745	0.6728	0.9556	1.0000

Table 9: Summary statistics for aggregate CDS, CDS turnover, and missed trades of German funds from period-end and within-period CDS data categorized by an increase or decrease in CDS observable at period ends

This table reports the summary statistics for the same variables as in Table 8 (for variable definitions please refer to Table 8), but distinguishes between half-years where increases or decreases in CDS are observable from the past to the present period end between 2004 and 2010.

Germany

Variable	N	mean	sd	min	p25	p50	p75	max
Increase in CDS from the past to the present period end								
Positive Period-end difference in CDS notional (in mio. $)	39	91.9121	145.3785	0.0000	5.1926	53.3732	124.6234	818.1523
Aggregate purchases CDS notional (in mio. $)	39	574.8107	1,367.0104	9.3534	58.7928	172.4753	375.8271	7,691.8169
Aggregate purchases of long CDS (as a frac. of agg. purchases CDS)	29	0.4784	0.3567	0.0000	0.1099	0.6022	0.7472	1.0000
Aggregate CDS sales notional (in mio. $)	39	482.8986	1,323.5661	3.9510	24.0985	60.0127	212.8005	7,567.1934
Aggregate sales of long CDS (as a frac. of agg. sales CDS)	29	0.4955	0.3804	0.0000	0.0909	0.5618	0.8095	1.0000
Missed trades (as a frac. of agg. CDS notional)	39	0.6543	0.3177	0.0816	0.2982	0.7074	0.9647	1.0000
Decrease in CDS from the past to the present period end								
Negative Period-end difference in CDS notional (in mio. $)	17	-133.3108	167.5813	-577.5111	-169.2292	-63.6070	-25.7500	-6.3877
Aggregate purchases CDS notional (in mio. $)	17	1,004.1601	2,038.2583	0.5392	7.0403	92.4582	1,026.1670	8,151.6802
Aggregate purchases of long CDS (as a frac. of agg. purchases CDS)	14	0.3766	0.3777	0.0000	0.0000	0.4030	0.6509	1.0000
Aggregate CDS sales notional (in mio. $)	17	1,137.4709	2,039.5431	11.7768	73.6050	288.1200	1,246.6478	8,186.6416
Aggregate sales of long CDS (as a frac. of agg. sales CDS)	14	0.3957	0.3856	0.0000	0.0000	0.4521	0.6666	1.0000
Missed trades (as a frac. of agg. CDS notional)	17	0.5631	0.3558	0.0205	0.1988	0.6377	0.8683	0.9957

Table 10: T-test for differences in means of CDS holdings of German funds that comment on CDS use versus those that do not comment

This table shows the results of the t-test for differences in means of the following end-of-period variables for German funds that comment on CDS use versus those that do not comment: CDS notional (sum of long and short positions), long CDS notional, short CDS notional, CDS net notional (long – short positions), unrealized value change (expressed as a fraction of a fund's total net asset value (TNA)), and the TNA in million $. The last column reports the p-values of Levene's test for the equality of group variances. *, **, and *** indicate statistical significance at the 10%, 5%, 1% level respectively. Standard errors are presented in brackets.

Germany

Variable	No comments (N=81)	CDS comments (N=25)	Difference	(d_se)	Levene's test (p-value)
TNA (in mio. $)	1,855.3420	885.8165	969.5250***	(258.7690)	(0.0049)
CDS notional (as a frac. of TNA)	0.1274	0.3221	-0.1947**	(0.0543)	(0.0000)
Long CDS notional (as a frac. of TNA)	0.0489	0.1143	-0.0654***	(0.0200)	(0.3740)
Short CDS notional (as a frac. of TNA)	0.0785	0.2079	-0.1293*	(0.0406)	(0.0000)
CDS net notional (as a frac. of TNA)	-0.0297	-0.0936	0.0639	(0.0338)	(0.0000)

Table 11: Misleading report comments on CDS of German funds

This table shows the misleading report comments on CDS and compares it to the fund's TNA (in $), long CDS notional, and the short CDS notional at the respective reporting date (both expressed as a fraction of a fund's TNA). Number (No.) refers to individual top30de funds listed in Table 2.

No.	Date	CDS comments	TNA	Long CDS / TNA	Short CDS / TNA
8	30.09.2007	The management used various hedging instruments (so-called credit derivatives) to decrease the risks from the overall market and individual positions. (p. 96)	1,210,245,700	0.0818	0.2623
8	31.03.2008	The management used various hedging instruments (so-called credit derivatives) to decrease the risks from the overall market and individual positions. (p. 78)	916,274,126	0.1070	0.3891
12	31.12.2006	(The management) could further decrease the credit risks from corporate bonds and the variation in return differences as related to government bonds by using financial derivatives in the form of Credit Default Swaps. (p. 14)	746,608,621	0.0000	0.0670
12	30.06.2007	Beyond that, (the management) could further decrease the credit risks from corporate bonds and the volatility of the return differences as related to government bonds by using financial derivatives in the form of CDS (Credit Default Swaps). (p. 14)	633,766,370	0.1183	0.3945
12	31.12.2007	Besides, the management could further decrease the credit risks from corporate bonds and the volatility of their risk premia by using financial derivatives in the form of Credit Default Swaps (CDS). (p. 17)	300,107,097	0.1638	0.4310
12	30.06.2008	Beyond that, (the management) could further decrease the credit risks from corporate bonds and the volatility of the return differences as related to government bonds by using financial derivatives in the form of CDS (Credit Default Swaps). (p. 18)	246,019,541	0.3238	0.3063
12	31.12.2008	The management used financial derivatives in the form of Credit Default Swaps (CDS) to decrease the credit risks from corporate bonds in the portfolio. (p. 17)	209,893,332	0.1677	0.3708
13	30.11.2008	In the area of corporate bonds, we concentrated on the financial sector and used instruments to hedge against default of payments (Credit-Default-Swaps). (p. 1)	506,718,005	0.1364	0.1331

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Part 3

Manager Characteristics and Credit Derivative Use

by U.S. Corporate Bond Funds

Manager Characteristics and Credit Derivative Use by U.S. Corporate Bond Funds

by Dominika Paula Gałkiewicz

Abstract

This study analyzes whether certain characteristics of U.S. corporate bond fund managers determine their use of credit derivatives. Results suggest that a manager's education, age, experience, and skill are positively correlated with a fund's CDS holdings. In particular, funds with successful, older, and more experienced managers are more likely to take on credit risk via selling CDS protection as opposed to funds with younger managers or managers that were educated at prestigious universities due to differing concerns about their careers. The above results suggest that the characteristics of fund managers affect a fund's risk taking via derivatives, in addition to the fundamentals of a fund.

JEL Classification: G23, G28

Key Words: Manager, manager characteristics, mutual funds, derivative use, credit default swaps

1 Introduction

Credit derivative use heavily increased after the turn of the century and led to severe losses among financial institutions and mutual funds during the financial crisis 2007-2009 (Brice (2011), Adam and Guettler (2014)).[1] However, it is still an open question as to what determines the use of derivatives by funds, such as investments in credit default swaps (CDS). Which funds choose to hedge versus taking on additional exposure via CDS, and to what extent?

Existing literature links fund characteristics (e.g., Koski and Pontiff (1999), Johnson and Yu (2004) and Marin and Rangel (2006)) and regulation (Gałkiewicz (2014)) to a fund's derivative use. However, recent literature suggests that specific characteristics of a fund manager determine risk taking as well (e.g. Brown, Harlow, and Starks (1996), Chevalier and Ellison (1997), Kempf, Ruenzi and Thiele (2009), Cici and Palacious (2013), and Adam and Guettler (2014)). So far, little is known about the link between manager characteristics and the decision to use derivatives. This study analyzes the types of CDS used by corporate bond funds and the determinants of a fund's decision to use CDS. In particular, beyond single versus team structure of the management the potential impact of manager characteristics is analyzed, such as the assets under management, age, tenure, gender, type and quality of education of a manager (or team).

For the purposes of this study, the 100 largest U.S. corporate bond funds included in the CRSP database (as determined by the size of their net assets in mid-2004) are investigated. They capture ca. 75% of the respective market (Adam and Guettler (2014)). Extensive CDS data including their quarterly notional amounts, market values, and direction (long or short) are collected by hand from the funds' annual, semiannual, and quarterly U.S. filings, which are obtained from the SEC or via the EDGARpro database. Fund-level data stem from CRSP, while management team characteristics are obtained from Morningstar (and supplemented by information from CRSP, Bloomberg, and fund websites).

Overall, funds most often use multi-name CDS written on CDS indices and bond indices, which are not asset-backed securities (ABS), while the majority of single-name CDS reference issuers stem from the industries of financials, others, and sovereign governments categories. During the height of the crisis in 2008, a significant increase in short CDS written on multi-name underlying positions and long single-name CDS is observable. The results indicate that the probability to use CDS is associated with

[1] For example, Mahieu and Xu (2007) and Minton, Stulz, and Williamson (2009) presume that only a small fraction of loans are hedged by banks via CDS. Furthermore, Van Ofwegen, Verschoor, and Zwinkels (2012) find a positive relationship between credit derivative use and the insolvency risk of the 20 biggest European financial institutions.

the type and quality of a manger's education. Managers with a master's (as compared to bachelor's) degree and managers that hold a degree from a top 20 university are more likely to use CDS. This suggests that better educated and networked managers have a higher level of sophistication necessary to use derivatives (e.g., Cici and Palacious (2013)), and do not shy away from using CDS. By contrast, team-managed funds are less likely to use CDS.

Besides analyzing the choice to use CDS, I analyze the decision to stay net short in CDS as opposed to staying net long. This is particularly interesting as net short CDS strategies had a high potential for loss during the crisis (Adam and Guettler (2014)).[2] The size and direction of the CDS net notional (long – short positions) allows an estimation of whether CDS were largely used for hedging (if positive, net long in CDS) or gaining exposure (if negative, net short in CDS). Managers having higher assets under management, i.e., those who were successful in the past (e.g., Berk and Green (2004), Wu, Wermers, and Zechner (2013)), are more likely to stay net short in CDS when using CDS. A similar result can be observed for managers who are older and more experienced. On the contrary, younger managers and managers who obtained their degree at a prestigious university are less likely to stay net short in CDS when using this instrument. The finding that highly reputed managers pursue more risky investment strategies is consistent with the prevalence of different sensitivities to the performance-termination relationship (Chevalier and Ellison (1999a)). Hence, managers with a lower reputation tend to shy away from risky investment strategies, potentially out of fear of losing their job.[3]

This study adds to earlier studies on derivative use (e.g., Koski and Pontiff (1999), Johnson and Yu (2004), and Marin and Rangel (2006)) by showing that, in addition to narrow fund characteristics, the management structure of a fund, number of women in management, the type and quality of a manger's education as well as experience and professional skill play a significant role in the extent and type of CDS use by a fund.[4] To the best of my knowledge, this is the first study that controls for professional skill via the assets under the management of a manager (or team) across several funds in an open-end mutual fund setting and shows its importance for a fund's decision to stay net short in CDS.

[2] For example, U.S. corporate bond funds pursuing net short CDS strategies during the crisis had alphas, which were 51-80 basis points lower per month than those of funds that were net long (Adam and Guettler (2014))

[3] If convexity of fund flows is given and a manager's salary (and job termination) depends on its fund's TNA, managers might engage in fund tournaments and fund family tournaments to attract higher investor inflows and support from a fund family (e.g. Brown, Harlow, and Starks (1996), Chevalier and Ellison (1997), Kempf and Ruenzi (2008), and Kempf, Ruenzi, and Thiele (2009)). However, high tenure managers care less about performance-based compensation than younger managers ((Chevalier and Ellison (1997), and Kempf, Ruenzi and Thiele (2009)).

[4] Current derivatives studies show that, among others, the occurrence of female fund managers makes using options (Cici and Palacious (2013)) or CDS (Adam and Guettler (2014)) by a fund less likely. This is also the case with regard to option use if funds have high tenure managers or managers with high GMAT scores in place (Cici and Palacious (2013)).

The results are relevant for the public and regulators as the characteristics and incentives of managers determine the investment behavior of funds.

The rest of the paper proceeds as follows. Section 2 presents CDS-related strategies. In section 3, the related literature is discussed and hypotheses are developed. The data are presented in section 4. Section 5 analyzes fund CDS use in detail and the determinants of a fund's decision to use, and extend the use of CDS. Section 6 concludes.

2 CDS Related Strategies

Regarding bought CDS (protection buyer, long position), one can at least distinguish between four strategies: First, buying CDS protection on a specific underlying bond without having the underlying bond in the portfolio (naked long CDS) is probably a bet on the deterioration of the creditworthiness of a company. This strategy has a speculative nature and exposes the fund to additional counterparty risk.[5] Second, having the underlying in the portfolio and buying CDS protection on it is likely a way to hedge against a value loss of the bond caused by its deteriorating credit quality.[6] Third, simultaneously buying a bond and CDS protection on this particular bond can be perceived as a way to exploit temporary spread differences in the CDS market and the bond market, which are due to mispricing or differing counterparty and liquidity risks in both markets. Buying CDS at a lower spread than implied by the bond spread (CDS basis = CDS spread - bond spread) without further assuming the default of the counterparty would be a so-called "negative basis trade", or a way to realize arbitrage gains.[7]

In the case of sold CDS (protection seller, short position), at least two additional strategies should be mentioned: First, selling CDS protection and investing the notional amount into Treasuries would allow a fund to synthesize a bond/index, e.g., to diversify the portfolio. Additionally, this investment strategy could be the only way, or at least a cheaper way, to acquire a specific bond, depending on market conditions (e.g., Stulz (2010)).[8] Second, selling CDS protection without simultaneously increasing Treasuries is similar to buying a bond and borrowing the notional principal of the bond

[5] However, it might be that by entering into long CDS on financial institutions, a fund hedges part of its counterparty exposure. By contrast, a high volatility in long CDS positions could also be an indicator of speculative strategies.
[6] Buying CDS on an underlying position that is highly correlated with a bond in the portfolio would be an additional way to hedge against a value loss of this bond.
[7] See Oehmke and Zawadowski (2013) and "Get Positive Results With Negative Basis Trades" [http://www.investopedia.com/articles/trading/08/negative-basis-trades.asp#axzz2Io8W8UVf, visited on 15.12.2012].
[8] It could also be a way to bypass issuer-oriented rules in the U.S., for example, the diversification rule, that restrict a fund's investments into securities of one issuer to 5% of a fund's TNA. Bonds and CDS are usually accounted for at market values under this rule, with CDS typically having a much smaller fair value, while having the same characteristics when used in combination with Treasury securities to synthesize bonds. See Gałkiewicz (2014).

from a bank. In doing so, a levered bond position is created, which is significantly riskier than a regular, unlevered bond position. If the CDS underlying positions are different from the other holdings, gaining additional exposure could help diversify the portfolio. Nevertheless, this strategy has a speculative nature. In addition, one can exploit the interest rate changes over time by buying CDS at low levels and selling them at high levels of credit risk premia (credit market timing).[9] In the case of bond funds, one could have bought CDS before the financial crisis of 2007 to 2009 and sold them during the crisis to realize a gain. Alternatively, funds can buy or sell CDS to offset previously sold or bought CDS positions on exactly the same securities (with the same notional amount, coupon, and maturity) to close existing positions.

Focusing on the aggregate single-name or multi-name long and short CDS positions of funds does not allow one to distinguish the purposes of CDS use (e.g., hedging or negative-basis trading). However, the size and direction of the CDS net notional allows an estimation of whether CDS were largely used for hedging (+) or gaining exposure (-), as suggested by Adam and Guettler (2014). Furthermore, based on the matching of CDS references, I can distinguish the part of the CDS used to close existing positions from the other that reflects ongoing strategies at reporting date.

3 Related Literature and Hypotheses

3.1 Literature Review

Early studies on derivative use (e.g., Koski and Pontiff (1999), Johnson and Yu (2004) and Marin and Rangel (2006)) suggest that the decision to use derivatives is affected by fund characteristics, such as membership in a fund family, size, age, expense ratio, turnover ratio, and investment style.[10] Further, when analyzing the use of derivatives by funds, Koski and Pontiff (1999) proposed the cash flow management hypothesis as an alternative explanation to the tournament hypothesis. New cash investments or redemption requests to the funds automatically change the risk position of funds, with increasing cash positions decreasing risk and increasing borrowing increasing risk. Derivatives might help funds smooth this effect and reach a target risk level faster. Although the results of earlier studies on the impact derivative use has on the risk and return profile of funds are ambiguous, derivatives can be used to increase the volatility of returns in accordance with the tournament hypothesis. Thus, if convexity of fund flows is given and a manager's salary (and potential termination

[9] See Adam und Guettler (2014).

[10] In a recent study, Cici and Palacious (2013) show that option use by funds is positively related to their size and expense ratios, and negatively related to having a high tenure manager in place and the occurrence of women in management. For a subset of managers, they also show that managers with high GMAT scores are less likely to use options.

from the job) depends on their fund's TNA, managers might engage in fund tournaments and fund family tournaments to attract higher investor inflows and support from a fund family (e.g., Brown, Harlow, and Starks (1996), Chevalier and Ellison (1997), Kempf and Ruenzi (2008), and Kempf, Ruenzi, and Thiele (2009)).[11] In consequence, derivatives might be used as means by which managers influence the riskiness of their funds to increase returns after past short-term relative under- or outperformance. Along the same lines, Almazan, Brown, Carlson, and Chapman (2004) show that, consistent with an optimal contracting equilibrium, in the fund industry internal restrictions are most common at funds managed by boards with fewer outside directors, if the portfolio manager is more experienced, if the fund is managed by a team, and if the fund does not belong to a large complex. Furthermore, Deli and Varma (2002) find that funds decide to permit investments in only derivatives that offer the highest transaction-cost benefits.

Another related stream of literature focuses on the performance of managers (or teams of managers) of mutual or closed-end funds based on variables controlling for the quality of managers, e.g., Chevalier and Ellison (1999a), Chevalier and Ellison (1999b), Atkinson, Boyce Baird, and Frye (2003), Baer, Niessen and Ruenzi (2009), Baer, Kempf and Ruenzi (2011), and Wu, Wermers and Zechner (2013). When analyzing single and team managers of U.S. equity funds between 1996 und 2003, Baer, Kempf and Ruenzi (2011) find that teams make less extreme investment decisions and follow more stable investment styles over time than single managers (however, on average, team-managed funds slightly underperform single-managed funds). According to the authors, this implies that teams average out the extreme opinions about a fund's investments of their members in the sense of the diversification of opinions theory (Baer, Kempf and Ruenzi (2011)). Their findings stand in opposition to former results of experimental studies conducted on group decision-making (e.g., see Stoner (1961), Wallach, Kogan and Bem (1961), Wallach and Kogan (1965), Stoner (1968), Pruitt and Teger (1969), and Brown (2000) for an overview), which show that teams take more extreme and inferior decisions than individuals. Almazan, Brown, Carlson, and Chapman (2004) show that teams often face internal fund restrictions on investments, which they relate to the lower stakes in terms of reputation teams have in comparison to their single-manager counterparts and therefore the incentive to limit their effort (Holmström (1982)).[12] Patel and Sarkissian (2014) also find that teams do not take excessive risks and trade less aggressively than single managers (leading to additional fund inflows and higher risk-adjusted returns). They attribute these findings to the higher benefits (and lower

[11] Additionally, Taylor (2003) confirms the former findings of Chevalier and Ellison (1997) that managers of well-performing funds have an incentive to increase the riskiness of their funds in the second half of the year in order to stay ahead of poorly-performing funds in a game theoretical framework.

[12] Free-riding within teams (Holmström (1982)) is often referred to in economics by, e.g. Alchian and Demsetz (1972), Rasmusen (1987), and Nalbantian and Schotter (1997).

costs) of information generation by interaction within teams, following the studies of Sharpe (1981), Barry and Starks (1984), and Sah and Stiglitz (1986, 1991). Sah and Stiglitz (1986, 1991) stress that teams responsible for portfolio management are able to reduce portfolio risk and induce better performance through the diversification of style and judgment of their members. The results of the study of Patel and Sarkissian (2014) further suggest that the lack of observable outperformance of teams in the studies of, e.g., Chen, Hong, Huang, and Kubik, (2004), Massa, Reuter, and Zitzewitz (2010), and Baer, Kempf and Ruenzi (2011) might be driven by inconsistencies in the records of management structure in the CRSP database as compared to SEC filings or the Morningstar database.

Apart from team structure, literature provides insight into an extensive set of variables, used to approximate the quality of managers, that have an impact on the investment policies of funds, and hence, their performance. For example, the educational background of fund managers (bachelor's or master's degree, PhD (or equivalent)), and whether or not they obtained their degree from a prestigious university are expected to be important for the quality of education and professional network (e.g., Chevalier and Ellison (1999b)). Furthermore, young managers are more risk-averse than older managers due to the higher risk of termination, but at the same time, they might also be willing to put in more effort than their older counterparts (Chevalier and Ellison (1999a)). From Chevalier and Ellison (1999a) it is known that longer tenured managers are less responsive to performance-based compensation because of their higher reputation. On the other hand, during recessions when new job opportunities are rare, longer tenured managers fear to lose their jobs just as much as their younger counterparts (Kempf, Ruenzi and Thiele (2009)). In line with this argument, Wu, Wermers, and Zechner (2013) find that investors do not respond to the underperformance of longer tenured managers even in the context of closed-end funds, which, according to law, may not be distributed publicly (SEC Staff Report (2003)). Kempf, Manconi and Spalt (2013) find that performance is higher when managers have more experience in the industries in which the fund is investing compared to less experienced managers; Adam and Guettler (2014) reveal that funds with more experience using CDS perform better during the 2007-2009 financial crisis than funds with less experience. Furthermore, following the Berk and Green (2004) model, Wu, Wermers, and Zechner (2013) find that managers who generate high shareholder surplus (using fund premium as a proxy in the case of closed-end funds) capture rents on their professional skills by expanding the amount of assets under the control of management across several funds and increasing management fees, which are part of the expense ratio.

In addition, women are generally perceived as being risk-averse and less competent in financial decision making than men (e.g., Niessen-Ruenzi und Ruenzi (2013)). However, Atkinson, Boyce Baird,

and Frye (2003)[13] find no significant differences in terms of performance, risk, and other fund characteristics when comparing fixed-income funds managed by women and men. In their comprehensive overview study, Croson and Gneezy (2009) state that "the evidence suggests that managers and professional business persons present an important exception to the rule that women are more risk-averse than men."[14] Odean (1998) and Barber and Odean (2001) instead view gender as a proxy for overconfidence, with men being more overconfident than women, especially in tasks such as financial decision making. They show that men are trading too much in stocks and have lower returns. Niederle and Vesterlund (2007) argue that, in comparison with men, women shy away from competition, which can be explained by men being more overconfident and gender differences in preferences for competing, while risk and feedback aversion only play a minor role.

The impact of team composition on fund performance becomes visible in more recent studies. Baer, Niessen, and Ruenzi (2009) find that work-group diversity related to tenure and education, which represents informational diversity, has a positive impact on the performance of management teams. By contrast, Baer, Niessen, and Ruenzi (2009) find that work-group diversity in terms of gender and age, which reflects social-category diversity, has a negative impact on the performance of management teams. In another study, Patel and Sarkissian (2014) observe benefits if management teams are situated in financial centers and consist of more homogeneous team of managers in terms of education and age, possibly reflecting less friction caused by an alignment of career perspectives. Further research in needed on these topics to understand the drivers of the ambiguous, and sometimes conflicting, results provided by the aforementioned studies.

3.2 Hypotheses

In this study, I want to test several hypotheses motivated by previous research on the investment strategies of funds and apply them to the decision to use credit derivatives, such as CDS.

The focus of this study lies on an extensive set of variables, used to control for the quality of managers (their ability, effort, and knowledge), which have an impact on the investment policies and performance of funds. For example, Chevalier and Ellison (1999b) argue that the quality of the educational background of fund managers, as measured by university prestige, is important for the

[13] However, they find evidence of gender influencing the decision making of mutual fund investors who invest less into funds managed by women compared to ones managed by men, especially for the manager's initial year managing the fund. This result is confirmed by a more recent study on customer-based prejudice due to gender-based stereotypes by Niessen-Ruenzi und Ruenzi (2013), who suspect these stereotypes to negatively affect a fund family's decision to hire women.
[14] Croson and Gneezy (2009), p. 454.

quality of their education and professional network. Since using derivatives requires some level of sophistication (e.g., Cici and Palacious (2013)), better educated managers could be more inclined to use derivatives. From this follows hypothesis I:

Hypothesis I: Managers that were educated at more prestigious universities are more likely to use CDS.

Moreover, whenever more sophisticated, well-trained fund managers are able to earn economic rents on their skills and training through fees, the expense ratio might be related to derivative use, e.g., CDS. In addition, as suggested by Wu, Wermers, and Zechner (2013) who follow the Berk and Green (2004) model, managers that generate high shareholder surplus, using fund premium as a proxy in the case of closed-end funds, capture rents on their skills by expanding the amount of assets under the control of management across several funds and increasing management fees, which are part of the expense ratio. The assets under the management of managers (which are affected by the inclusion and exclusion of funds, fund flows, and returns) measure the output of their skill and experience over time. If better-skilled managers use derivatives, I expect those using CDS to extract rents via the assets under management (AUM) across several funds.[15] This also accounts for a fund family's policy to choose specific managers to manage one or all funds belonging to a fund family. From this reasoning follows hypothesis II:

Hypothesis II: Managers with higher assets under management are more likely to use CDS.

From Chevalier and Ellison (1999a) it is known that young managers are more risk-averse than older managers due to higher termination risk (Chevalier and Ellison (1999a)) and therefore might be less willing to use derivatives, such as CDS. However, young managers might also be willing to put more effort into the management of the fund (Holmström (1982), and Chevalier and Ellison (1999a)) and try to use their knowledge on derivatives to manage their funds more successfully than their peers (since the use of derivatives has increased over the last 20 years, education has focused more on this type of financial instrument). Furthermore, longer tenured managers are less responsive to performance-based compensation because of their high reputation. In addition, Wu, Wermers, and Zechner (2013) find that investors do not respond to the underperformance of longer tenured managers even in the context of closed-end funds. On the other hand, during recessions when job opportunities are rare, longer tenured managers fear the loss of their jobs just as much as their

[15] The expense ratio is not considered as it might lead to ambiguous results because it decreases over time as competition increases and because funds that have higher fractions of institutional holdings charge lower fees (ICI Fact Book (2013)).

younger counterparts (Kempf, Ruenzi and Thiele (2009)). From these insights into the sensitivity of managers with regard to performance-based termination, follows hypothesis III:

Hypothesis III: Younger managers are less likely to use CDS for risk-increasing purposes (i.e., staying net short in CDS) and more likely to use CDS for risk-decreasing purposes.

In addition, the presence of women in management might also influence a fund's decision to use CDS. According to Niessen-Ruenzi und Ruenzi (2013), women are generally perceived as being risk-averse and less competent in financial decision making. However, following the findings of Atkinson, Boyce Baird, and Frye (2003) and Croson and Gneezy (2009), women should not be perceived to be more risk-averse than men if both have equally high skill and knowledge in a professional setting.[16] If women are actually more risk-averse then men in the financial setting, women in single and team management roles could be expected to decrease the overall risk of a fund. Thus, hypothesis IV is based on the common perception of women being risk-averse:

Hypothesis IV: Female managers are less likely to use CDS for risk-increasing purposes (i.e., staying net short in CDS) and more likely to use CDS for risk-decreasing purposes.

Finally, the experimental literature on group decision making (e.g., Stoner (1961), Wallach, Kogan and Bem (1961), Wallach and Kogan (1965), Stoner (1968), and Pruitt and Teger (1969)) shows that teams raise more extreme opinions and consequently make more extreme decisions than individuals. Brown (2000) provides an overview of several possible socio-psychological explanations for this phenomenon. For example, according to social comparison theory, teams tend to shift their opinion towards an extreme opinion of a dominant team member as this kind of adjustment allows individuals to believe that they are more similar to the person they perceive to be their superior. However, in a professional setting, Baer, Kempf and Ruenzi (2011) find empirical evidence that teams make less extreme investment decisions and follow more stable investment strategies over time. The authors interpret the results as an indication that team members average out extreme opinions in the sense of the diversification of opinions theory. On the other hand, Almazan, Brown, Carlson, and Chapman (2004) show that between 1994 and 2000, teams managing U.S. equity funds face more restrictions on investments in equity options, index futures contracts, restricted stocks, on borrowing money, trading on margin, and short selling than single managers. They contribute this result to the fact that individual team members usually have less reputation at stake than single managers and

[16] According to Barber and Odean (2001), men are more likely to be overconfident in a financial environment, which could be observable in a higher extent of trading as compared to their women counterparts. However, further research is needed to disentangle the effects of gender-based differences in risk-aversion versus overconfidence in a finance environment.

therefore might decrease the amount of effort put into managing a fund (Holmström (1982)). In this context, one could imagine that teams might choose more extreme investment positions, e.g., invest in net short positions in CDS, not only because of reasons based on group shift theory, but also because of their (non-assignable) reputation. From these findings, hypothesis V follows:

Hypothesis V: Teams are more likely to use CDS for risk-increasing purposes (i.e., staying net short in CDS) and less likely to use CDS for risk-decreasing purposes than single manager.

4 Data

In order to investigate the decision of funds to use CDS (including various types of CDS), I collect the data about CDS holdings contained in the quarterly reports of the 100 largest U.S. corporate bond funds during the period 01.07.2004 to 31.12.2010 (see Adam and Guettler (2014) for a detailed explanation of the procedure). Since 2004, U.S. mutual funds are required to disclose the names of managers and report their portfolio holdings on a quarterly basis. The focus of this study is on U.S. funds that belong to the following Lipper fund classes: corporate debt funds A-rated, corporate debt funds BBB-rated, short investment grade, short-intermediate investment grade, intermediate investment grade, multi-sector income, and high current yield funds. Money market funds, treasury funds, municipal funds, mortgage funds, and fund reports created after a merger are excluded from the sample. The focus of the study is on the 100 largest U.S. corporate bond funds (as determined by the TNA that are included in the CRSP Survivor-Bias-Free U.S. Mutual Fund Database as of the end of the second quarter of 2004) since participation in the CDS market requires some critical size (Adam and Guettler (2014)). The largest fund in mid-2004 is the Total Return Fund of the PIMCO fund family with a TNA of $73 billion, while the smallest fund is the Federated Strategic Income Fund, belonging to the Federated Fixed Income Securities, with a TNA of $1 billion.

The U.S. annual, semi-annual and quarterly reports are obtained from the SEC webpage or via the EDGARpro database. In the first step, I search for details regarding CDS positions (i.e., CDS notional amounts of bought and sold positions, market values of CDS, reference assets including coupon and maturity, if reported) in the schedule of portfolio holdings. As a result, I end up with 45,101 CDS positions held by 69 funds at some point between mid-2004 and the end of 2010. The final sample consists of 2,557 fund-quarter observations; however, the lack of availability of various manager characteristics reduces my sample to 2,235 and 1,957 fund-quarter observations, respectively.

The extent of total CDS use at reporting date is determined by summing up the notional amounts and relating them to a fund's TNA at the fund-quarter level (**Table 1**). However, for investigating the

determinants of the decision to use CDS, I use a dummy variable that indicates whether or not a fund used CDS in a particular quarter between 2004 and 2010 ("CDS Dummy"). According to Adam and Guettler (2014), U.S. funds pursuing net short CDS strategies during the crisis had alphas that were 51-80 basis points lower per month than these of funds that were net long. Therefore, in a second step, I use a dummy variable that indicates whether or not a fund was net short in CDS ("CDS net short") and therefore created exposure to credit risk. In subsequent analyses of the determinants of CDS use, these dummy variables are replaced by the CDS notional ("CDS/TNA") and CDS net notional amount ("CDS net/TNA") as related to a fund's net assets. The CDS notional amount reflects the par amount of credit protection that is bought or sold by a fund. The net notional position is determined based on aggregated long minus short CDS positions and reflects a fund's indirect leverage.

In addition, in order to analyze the extent that funds use various types of CDS, I split up the overall CDS position into various types of CDS like long or short single-name CDS, and multi-name CDS. Since the CDS net notional includes, but is not limited to, offsetting positions, I separate offsetting positions from the other reported CDS positions. All positions identified as offsetting tools do not represent ongoing strategies, i.e., funds may have used these at an earlier date for unknown reasons (e.g., credit market timing, speculation, synthesizing securities, hedging). Usually long and short CDS positions cancel each other out if both are written on exactly the same securities (with the same notional amount, coupon, and maturity). However, some of the funds do not report the details of the underlying bonds of CDS, such as coupon and maturity. Therefore, to determine the fraction of offsetting positions within long (and short) CDS in a more precise manner than by subtracting aggregated short CDS from long CDS, I match long and short CDS positions written on the securities of the same issuers (e.g., identify corporate names, bond, CDX or ABX indices). To distinguish them from the net notional positions derived from aggregated long minus short CDS, they are referred to as either offsetting or non-offsetting positions later in the text. **Table 1** provides descriptive statistics for all available CDS observations, which are discussed in detail in section 5.1.

Moreover, I obtain data on fund characteristics, such as inception date, expense ratio, turnover ratio, the fraction of institutional investors, fund class, fund flows, and returns[17], from CRSP. In addition, based on the turnover ratios (CRSP) and average duration figures (Morningstar), I also derive an adjusted turnover ratio, i.e., the residual of the regression of turnover ratio and the average duration of funds, which is available for the period 2006 to 2010 (not reported). This adjusted turnover ratio accounts for the fact that some of the funds might be short-term oriented and have systematically higher turnover ratios than their long-term oriented counterparts. Additionally, to proxy for other

[17] I thank Adam and Guettler (2014) for providing me with 1F- and 4F-alphas determined over 3 and 6 months.

unobservable factors that govern the use of derivatives, I create an additional variable ("other derivatives"). Data from question 70 of Form N-SAR allows me to identify whether or not a fund uses other derivatives, such as options or interest futures.[18]

I obtain data on manager characteristics from the Morningstar database, check it with the CRSP descriptions, and supplement it with information provided by Bloomberg, fund reports, and fund websites. Finally, I end up with information on 492 managers, comprising 138 management constellations. In particular, this includes 57 constellations of single managers (3 women and 54 men) and 81 constellations of teams (21 out of the 81 teams comprise one woman manager; 6 include two women managers). The assets under management variable ("AUM") is created using the names of managers in the sample and their belonging to specific teams. This variable is, by definition, highly correlated with fund size (especially for single managers); therefore, in addition to AUM, the relative importance of a particular fund's TNA in relation to the AUM – instead of fund size – is incorporated in the specifications that contain an extended set of variables. **Appendix A** contains a full list of variables used in the study together with descriptions of their construction process and **Table 2** summarizes the descriptive statistics, which are discussed in detail in section 5.2.

5 Results

After presenting an analysis of the extent that funds use various types of CDS, the characteristics of the sample funds are shown in detail. Next, the results from logit regressions are shown for the determinants of a fund's decision to use CDS, the use of net short strategies in CDS, and the extent of CDS use.

5.1 The Use of Various Types of CDS by Funds

The following analyses show which types of CDS are predominantly used by funds. **Figure 1** presents the increase in the number of CDS users from 22 in 2004 to 61 funds in 2008, back to 46 funds in 2010. In **Table 1**, various CDS data are listed for all funds that use CDS (1,768 observations) and for the subgroups of funds choosing to stay net long or short in CDS in a particular period. According to **Table 1**, the mean percentage of CDS in relation to a fund's TNA, aggregated on a quarterly basis between mid-2004 and 2010, equals 4.76% (the median value is 0.90%) of a fund's TNA. Accounting

[18] For each a dummy variable that equals "Y", if the fund is permitted to write or invest in, e.g., options and a dummy that equals "Y" if the fund was engaged in this activity during the reporting period can be observed. See Form N-SAR, question 70, [http://www.sec.gov/about/forms/formn-sar.pdf, visited on 20.12.2013]. However, the sample funds face an almost similar level of restrictions (not reported).

for an average of 3.05% of TNA, short CDS positions of a fund at reporting date are approximately two times higher than long CDS positions (with an average value of 1.70% of TNA). The median values indicate that funds tend to keep a small position of short CDS and not hold any long CDS. For the funds that are net short in CDS 791 times, the average short CDS is almost twice as high as the general trend at 6.08% (median value of 2.32%) of TNA, while the average long CDS equals 1.28% (median value of 0%). By contrast, funds that choose to stay net long in CDS in 356 quarters have three times higher average long CDS – 5.60% (median value of 2.44%) of TNA – than suggested under the general trend, while short CDS reach an average level of 1.63% (median value of 1.32%).

Figures 2 to **4** show the development of the average and median CDS positions during a particular period conditional on CDS use. **Figure 2** shows that the long and short CDS positions of funds are much higher between mid-2007 and the end of 2008 than in the pre- or post-crisis periods. In particular, a significant increase in long CDS written on single-name references and in short CDS written on multi-name underlying positions is observable during the height of the crisis (**Figure 3**), while CDS written on multi-name references, on average, dominate CDS use across the period. Almost all funds keep more short than long CDS (went net short) until the end of 2008, when the credit risk premium (measured by the yield difference between BBB-rated debt and Treasury securities) rose significantly. Hence, funds that used short CDS as a speculative tool (not for synthesizing bonds in combination with Treasury securities) during the financial crisis potentially suffered substantial additional losses because of the large increase in credit risk premia at this time (see **Figure 2**). As opposed to findings from average CDS figures, median values indicate that long multi-name CDS are only kept by funds between the second half of 2006 and the second half 2009. Furthermore, median values indicate that short single-name CDS are used constantly over time, while their multi-name counterparts are used from time to time and reach a peak after the Lehman bankruptcy. This might be a sign that in a difficult environment where both trust and liquidity in the market dry up, the majority of funds focus on multi-name CDS as means by which they can hedge or increase exposure to the market for diversification purposes more easily than direct investments in bonds or indices. The descriptive analysis thus far indicates a wide heterogeneity in the CDS strategies of funds.

The fair value of CDS as related to a fund's TNA in **Table 1** reflects the unrealized gain/loss from CDS that lowered a fund's TNA at reporting date. It shows that, on average, funds suffer an unrealized loss of -0.19% of TNA (0% in median) from CDS. Interestingly, the highest observable unrealized loss equals 52.30% and is realized by a fund that chose to stay net long in CDS implying that it possibly pursued costly hedging, unsuccessful betting and/or credit market timing strategies. The highest

unrealized gain of 15.07% can be identified for a fund staying net short in CDS where short CDS could have been used for credit market timing, creating leverage or synthesizing bonds/indices.[19] In general, as presented in **Table 1**, funds staying net long in CDS keep, on average, more long CDS written on single-name than on multi-name references (2.98% vs. 2.62% of TNA) together with some short CDS mainly written on multi-name references. On the other hand, funds staying net short mostly use short CDS written on multi-name references (3.38% of TNA vs. 2.69% invested in single names) together with some long CDS mainly written on multi-name references. Mortgage related ABS, which were the center of attention during the crisis, play, on average, only a secondary role as CDS references for mutual funds (as opposed to insurance companies or banks).

In **Table 1**, long and short CDS are further distinguished by those used to close existing short and long CDS positions on an issuer-level basis and those that are non-offsetting.[20] Comprising 0.29% of a fund's TNA (on average), offsetting long CDS are much smaller than their non-offsetting counterparts, which make up 1.41% of TNA. The non-offsetting long CDS possibly indicate within reporting period investment activity of funds, which might have previously used these CDS for any strategy specified in section 2. In the case of short CDS, the same two categories are distinguished. Short CDS used for offsetting existing long CDS comprise 0.29% of TNA (as in the case of offsetting long CDS) and are much smaller than short CDS used for non-offsetting purposes, which account for 2.75% of TNA.

Appendix B shows another classification of CDS references based on a particular industry as defined under the Fama-French twelve industry classification (Consumer Non-Durables, Consumer Durables, Manufacturing, Energy, Chemicals, Business Equipment, Telecommunication, Utilities, Stores, Health, Financials, Other)[21] plus the category "Sovereigns" for U.S. and foreign government bonds. The "Other" industry category captures bonds related to the businesses of Mines, Construction, Transport, Hotels, Bus Services, Entertainment, and everything else that is not classified above. As shown in **Appendix B**, the number of CDS contracts referencing Financials, Others, and Sovereigns are multiple times higher than for other industries. Furthermore, the size of net positions (long minus short CDS) varies significantly at the fund-quarter-issuer level. In terms of size, long single-name CDS positions most often reference companies from the following industries: Stores (0.178% of a fund's TNA per issuer), Manufacturing (0.130%), and Non-Durables (0.126%). Most of the issuers of short CDS references stem from the Durables (-0.347% of a fund's per issuer), Sovereigns (-0.276%), and

[19] This is possible because a fund can, at most, use all of its net assets for derivative coverage and since only short CDS (and not long CDS) require coverage. Thus, a fund could keep short CDS with a notional amount up to 100% of TNA as long as it is able to meet redemption requests immediately. A fund could keep long CDS with a notional value higher than 100% of TNA because their fair values are only restricted by the obligation to meet redemption requests. See Gałkiewicz (2014).

[20] Details on the underlying issues of CDS are often not reported (i.e., the maturity and the coupon of a bond is missing).

[21] For more information please refer to Kenneth R. French's website "Detail for 12 Industry Portfolios", [http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/Data_Library/det_12_ind_port.html, visited on 20.03.2014].

Finance (-0.208%) categories. Altogether, the highest net positions at the issuer level are observable in the industry categories: Durables (-0.302%), Sovereigns (-0.222%), and Utilities (-0.165%).

The main driver of these general trends are funds that decide to stay net short in CDS and sell protection via CDS on issuers from the Durables (-0.447% of a fund's TNA per issuer), Sovereigns (-0.302%), and Finance (-0.234%) categories. They also buy CDS protection on issuers from the Durables (0.087%), Stores (0.083%) and Non-Durables (0.066%) industries, but to a much smaller extent. Funds that decide to stay net long in CDS buy protection via CDS referencing issuers from the industries: Finance (0.515% of a fund's TNA per issuer), Energy (0.512%), and Stores (0.353%), while selling CDS protection on issuers from the Durables (-0.213%), Sovereigns (-0.144%) and Utilities (-0.095%) categories. There is some similarity across the two subgroups to the extent that both invest in long CDS that reference issuers from the Stores category and short CDS that reference issuers from the Durables and Sovereigns categories. Concerning net positions, it is observable that funds taking on more risk (staying net short in CDS) focus on Durables (-0.361%), Sovereigns (-0.275%) and Finance (-0.216%) as CDS references, while potentially hedging funds concentrate on Energy (0.454%), Manufacturing (0.350%), and Finance (0.431%). This adds to the growing belief that funds pursue different strategies; however, further analysis of the changes in a fund's asset allocation is needed to draw final conclusions. One thing funds have in common is that they are often either buying or selling protection via CDS on issuers from the Financials industry possibly to hedge counterparty risk and/or to take on additional exposure.

Overall, large heterogeneity regarding the types and extent of CDS used is observable across funds.

5.2 Initial Analysis of Potential Determinants of CDS Use by Funds

Table 2 reports the descriptive statistics for all observations used in further analyses, in particular for funds that do not use CDS compared to funds that use CDS. Out of the 2,557 observations, 789 are observations of 31 funds not using CDS (CDS nonusers) and 1,768 show 69 funds using CDS at least once between mid-2004 and 2010 (CDS users). As suggested by the results of the t-tests and the Wilcoxon rank-sum tests for differences in means and distributions, most fund characteristics significantly (at the 1% confidence level) differ for CDS nonusers in comparison to CDS users. For example, the observable mean (median) size of the CDS nonusers is $7,247 mio. ($3,634 mio.), which is higher than of the mean size of CDS users at $5,214 mio. ($1,864 mio.). CDS users are, on average, older than CDS nonusers, with an average age of 22.42 compared to 20.65, and are more often members of a fund complex (80.88% of the time versus 60.46%). Interestingly, less CDS nonuser

observations belong to funds that are investment grade than for CDS users (46.13% versus 67.87%, respectively); thus, most high-yield funds do not use CDS. The observable fraction of institutional investments is smaller for CDS nonusers (with average values of 19.62% and median values of 5.66% of TNA) when compared to the fraction observed for CDS users (39.52% and 19.67%), suggesting that the investment focus of a fund and its willingness to use CDS might be affected by professional investors. Unlike the aforementioned characteristics, the expense ratio is comparable for CDS nonusers and users with a mean (median) of 0.77% (0.78%) for the former and 0.78% (0.69%) for the latter. By contrast, the turnover ratio equals 93.17% (51%) for CDS nonusers, while it is 164.34% (106%) for CDS users, which indicates that CDS users generally have higher trading activity (the difference remains even if the short-term orientation of funds is accounted for via the adjusted turnover ratio).

CDS users keep derivatives other than CDS, on average, in 63.08% (100% in median) of the quarters, while CDS nonusers only rely on other derivatives 16.03% of the time, on average (and no time in median). Furthermore, CDS nonusers experience (on average and for median values) new inflows of funds, while CDS users suffer from outflows. No significant differences in average quarterly returns and standard deviations can be observed. This is in line with previous findings of Adam and Guettler (2014), who, in general, do not find any performance and risk differences between these two groups.

Regarding manager characteristics, there are some commonalities observable in the groups of CDS users and nonusers. CDS nonusers (CDS users) are managed by single-managers in 38.78% (35.80%) of the quarters; for the remaining quarters, teams, on average, consist of more than two (three) people without any women. In 75.41% (73.39%) of the quarters, the highest educational degree obtained by a manager of a CDS nonuser (CDS user) is a master's degree; in 18.53% (24.47%) of the quarters a bachelor's degree, and in 6.06% (2.14%) of the quarters a PhD title. Managers of CDS nonusers hold a degree from a top 20 university in the U.S. in 50.12% of the quarters, while this value is 51.11% for the managers of CDS users. The experience of the managers of CDS nonusers and CDS users is comparable, with a mean of 2.62 and 2.55 years and median of 2.5 and 2 years, respectively. However, significant differences are also observable. For example, managers of CDS users are older than their nonuser counterparts, with a mean (median) age of 44.6 (43) years compared to 42.6 (42) years. By contrast, the proportion of women in management is higher for CDS nonusers, with 10.83% compared to 4.49% for CDS users. Between mid-2004 and 2010, the mean size of the assets under management for CDS nonusers ($13,937 mio.) is smaller than for CDS users ($20,139 mio). However, the opposite is true when analyzing median values, with $5,379 mio. for CDS nonusers and $4,473

mio. for CDS users. The fraction of TNA to AUM indicates that managers of CDS users advise more funds compared to CDS nonusers (with a mean/median number of funds of 3/5 and 2/3).

Overall, the above comparisons suggest that differences between CDS users and nonusers are more pronounced on the fund level than for manager characteristics.

5.3 The Determinants of Fund CDS Use

5.3.1 The Determinants of the Decision to Use CDS and the Extent of CDS Use

Table 3 reports the marginal probabilities of pooled logit regressions for the decision to use CDS, evaluating all independent variables at their means (which are provided in **Table 2**) and dummy variables when switching from 0 to 1. As compared to columns (1)-(2), columns (3)-(4) also contain a proxy for a fund's use of derivatives other than CDS. In columns (5)-(6) the turnover ratio variable is replaced by the adjusted turnover ratio, which controls for the possible short-term orientation of funds. Past performance and standard deviation are likely to be highly endogenous variables, which is why I have not included them as regressors.

By comparing the results reported for a fund's decision to use CDS in columns (1)-(2) with columns (3)-(4), one can see that after the inclusion of the variable "other derivatives", which serves as a proxy for other unobservable factors that govern the use of derivatives, "other derivatives" become significant and also the explanatory power of the model increases, as indicated by the pseudo R-squared. Based on this finding, which is related to the fact that credit derivatives are part of a broader group of derivatives, I consider this variable in all specifications that follow. In the specification containing the extended set of variables[22], in column (4) of **Table 3**, the probability of a fund to use CDS is positively related to the presence of a fund manager who obtained a degree from a top 20 U.S. university (by ca. 12%) or who has a master's degree (by ca. 14%). Regarding management teams, the respective dummy variables become 1 whenever the majority of the team members obtained a degree from a top20 university or hold a masters' degree in order to enhance the interpretation of results. This confirms hypothesis I and suggests that managers with a supposedly better education or/and network (e.g., Chevalier and Ellison (1999a)) have the necessary knowledge, and are willing, to use credit derivatives. A relationship between the professional skills of a manager as measured by assets under management and potential CDS use could not be detected;

[22] With regard to fund size, it should be noted that this figure only occurs in the first specification in columns (1), (3) and (5). In the extended set of variables it is excluded because two additional measures are added that are, by definition, highly correlated, i.e., assets under management (AUM) and the relative importance of a fund's TNA to AUM.

thus, hypothesis II cannot be confirmed. This means that better educated, but not necessarily more successful, managers are willing to use CDS. The reported results also show that the management structure of a fund (team vs. single manager) is relevant for the decision to use CDS. The probability to use CDS is by approximately 21% lower for funds that are managed by a team in comparison to those managed by a single manager, which is of high economic relevance. Once the turnover ratio is replaced by its adjusted version and the sub-period 2006 to 2010 is considered, the result for the education of managers at prestigious universities turns insignificant, while the existence of a manger with a PhD becomes significant, with those funds being ca. 20% more likely to use CDS. By contrast, managers who advise fewer funds, e.g. a single instead of multiple funds, become ca. 29% less likely to use CDS. This suggests that the factors affecting the decision to use CDS slightly differ over time.

In the specifications containing fund characteristics with and without an extended set of manager characteristics, the age of a fund, fraction of institutional investors, and the use of other derivatives in parallel are positively correlated with its decision to use CDS at some point in the time between mid-2004 and 2010. In particular, funds that are 10 years older than the mean age of about 20 years (as determined for the natural logarithm of fund age) are ca. 10% more likely to use CDS. It suggests that well established funds are more likely to use CDS, which stands in opposition to earlier studies (e.g., Johnson and Yu (2004), and Marin and Rangel (2006)), where a negative relation to derivative use was found for fund age.[23] Additionally, having a larger fraction of institutional investors than the average of 33% of a fund's TNA (by at least 10%) makes it more likely that a fund will use CDS (by about 3% in any specification). However, CDS users have on average 39% of their TNA in institutional hands, as opposed to 20% for nonusers. Nevertheless, it remains unclear whether or not institutional investors have the power to directly influence a fund's investment strategy. Alternatively, professional investors, who often face strict investment restrictions themselves, might seek more diversification by funds, e.g., they invest in mutual funds that use more or less risky investment strategies that lie within the allowed ranges (demand effect). The aforementioned findings remain stable even if the turnover ratio variable is replaced with its adjusted version and the period 2006 to 2010 is considered, as shown in column 6. Lastly, if a fund invests in other derivatives, its probability to use CDS increases by ca. 24%. As mentioned before, unobservable factors affecting a fund's use of derivatives other than CDS have a considerable impact on a funds decision to use CDS.

[23] One reason for this discrepancy might be that although mutual fund were already allowed to enter into derivatives for investment purposes before the year 2000, managers often faced many internal restrictions on derivatives use around this time (e.g., Almazan, Brown, Carlson, and Chapman (2004)). This and the fact that derivative markets heavily developed in the last decade, especially CDS markets, which were not considered in previous studies, might have determined investment strategies pursued by mutual funds.

In order to account for unobservable time invariant characteristics of funds and managers, the coefficients typically reported from the conditional fixed effects logit model are provided in **Table 5**. However, this type of model only shows, by definition, the results for the subgroup of the 53 funds (out of the total of 69) that use CDS at some point in time between mid-2004 and 2010. Columns (1)-(2) do not show any significant correlations between the determinants analyzed before and the decision to use CDS, suggesting that either fixed effects or a wide heterogeneity of reasons influence CDS use.

Previous literature (e.g., Koski and Pontiff (1999), Johnson and Yu (2004) and Marin and Rangel (2006)) suggests that the decision to use derivatives is affected by fund characteristics, such as membership in a fund family, size, age, expense ratio, turnover ratio, and investment style. The results show that a fund's decision to use CDS, however, is influenced, ceteris paribus, by fund characteristics, such as age, fraction of institutional investors, and its parallel investments into other derivatives. This difference might be explained by the fact that CDS markets developed significantly since 2004 and were not considered in previous studies. If the extended set of variables is considered, in addition to the other fund characteristics, ceteris paribus, the presence of a single manager instead of a team, a manager with a master's degree or who obtained a degree (bachelor's or master's) from a top 20 U.S. university, makes CDS use more likely. Thus, manager characteristics are highly relevant for a fund's investment behavior with regard to credit derivatives.

In **Table 6**, the "CDS Dummy" is replaced by the respective total CDS use (as related to fund's net assets) variable ("CDS/TNA"). Columns (1)-(4) [24] show the results of OLS regressions where columns (3)-(4) also include fixed effects controlling for unobservable time invariant characteristics of funds and managers. The analysis performed in column (2) is extended by applying the Heckman correction (Heckman (1976, 1979)) based on maximum likelihood estimation for non-random self-selection of funds into CDS use and reported in column (5). As presented in column (2) of **Table 6**, regarding manager characteristics, only the occurrence of a woman in management leads to a decrease of the relative figure of total CDS by 0.0301 (of a fund's TNA) indicating that women in management use CDS to a smaller extent than their male counterparts. Given the average size of CDS holdings of 0.0476 (of TNA) presented in **Table 1**, the impact of the variable is also economically important. Although the occurrence of women managers does not significantly decrease the probability to use CDS, it negatively affects the size of CDS holdings. Interestingly, neither of the manager characteristics identified beforehand as increasing the probability to use CDS influences the size of the CDS holdings. This is possibly due to the fact that funds highly differ in terms of the extent they use CDS holdings

[24] For brevity, it is not tabulated that using a Tobit model specification does not change the results qualitatively.

over time. This explanation would be in line with the comparison of the size of CDS positions for funds preferring to stay net short versus net long in CDS (as shown in **Table 1**) and the general pattern of CDS use (presented in **Figure 2**).

Furthermore, the extent of CDS use is significantly positively affected by a higher fraction of institutional holdings, higher fund outflows, and a fund's use of other derivatives. For example, a 0.1 higher fraction of institutional investors increases total CDS by ca. 0.0399 (of TNA), while using other derivatives in parallel increases the extent of CDS use by 0.0469 (of TNA). In addition, fund outflows, which are higher by 0.01 of TNA, lead to an increase in overall CDS of ca. 0.0007 (of TNA). Similarly, the results of the fixed effects regression reported in column (4) of **Table 6** also show that the amount of total CDS increases with an above period average increase in outflows. This effect does not show up in the logit analyses previously mentioned. Under the cash-flow management hypothesis, one would expect funds facing outflows (as, on average, observable for the sample of CDS users) to decrease risk via derivatives, e.g., by entering into long CDS.[25] Alternatively, funds facing outflows are usually under pressure to sell some of their securities and might therefore use derivatives for investment purposes, e.g., short CDS for synthesizing bonds/indices.[26] Later analyses might help clarify this issue. Furthermore, in column (4), it is shown that an increase in both the fund age and the level of experience of management increases the size of CDS holdings, which indicates that more experienced funds/managers (e.g., in using credit derivatives) are more likely to use this instrument.

The analysis of the extent of CDS use in column (5) is extended by applying the Heckman correction for sample selection. This two-stage estimation procedure considers the determinants of a fund's decision to use CDS in the first stage and the extent of CDS use in the second stage. It is reasonable to assume that the decision to establish a derivatives trading desk is made by the fund family, while managers can influence to which extent and how the fund uses derivatives. For example, Almazan, Brown, Carlson, and Chapman (2004) show that a fund's non-fundamental policy can be altered at the discretion of a fund's board of directors and include more business-specific restrictions. Therefore, in the selection regression (first stage), I focus on narrow fund characteristics; the results are similar to those reported in column (3) of **Table 3**. In the second stage, I additionally include manager characteristics. As suggested by the likelihood ratio test presented as a Wald test[27] (reported at the bottom of **Table 6**), the Heckman method is preferable to estimating two

[25] On the contrary, the risk decreasing effect of inflows could be smoothed by using derivatives, such as short CDS.
[26] Discussions with practitioners reveal that especially during the 2007-2009 financial crisis bond funds preferred to keep a large amount of cash holdings to be able to meet redemption requests and therefore decided to keep or build up exposure to individual names and indices via derivatives such as CDS. At this time, the levels of CDS use by various market participants peaked.
[27] If the errors are clustered, the likelihood ratio test is presented as a Wald test in STATA.

independent equations (at 5% confidence level) and together with the inverse of the Mills' ratio from the selection equation controlling for self-selection is recommendable. Results from column (5) of **Table 6** support the above findings regarding the negative (positive) impact of the occurrence of women (more experienced managers) on the extent of CDS use. Thus, managers who tend to use CDS often do not necessarily keep the highest/lowest positions in CDS which is supportive for a wide heterogeneity in terms of size of CDS positions across the funds and time.

5.3.2 The Determinants of the Decision to Stay Net Short in CDS and the Extent of Net CDS Use

Table 4 reports the marginal probabilities of pooled logit regressions for the decision to stay net short in CDS ("CDS net short"), provided CDS are used by a fund in a particular period. Again, columns (1)-(2) present the results including the turnover ratio variable, while columns (3)-(4) include the adjusted turnover ratio variable controlling for the possible short-term orientation of funds. The analysis performed in column (2) is extended by applying the Heckman correction (Heckman (1976, 1979)) based on maximum likelihood estimation for a non-random self-selection of funds into CDS use and reported in column (5). In column (2), one can observe that managers who are older or more experienced in advising top100 funds are more likely to stay net short in CDS. A comparable result is observable for managers with more assets under their management and for managers who obtained a PhD. Regarding economic importance, managers who are ten years older than the average age of 44.5 years are ca. 10% more likely to stay net short in CDS, while a one year increase in a manager's experience as related to a mean experience of 2.55 years would make it around 7% more likely for a fund to stay net short in CDS. Similarly, a 10% increase in the logarithm of AUM as related to its mean, that is equivalent to an increase in assets under management from ca. 5,526 (mio. $) to ca. 13,081 (mio. $), would increase the probability to stay net short in CDS by ca. 7%. The presence of managers who obtained a PhD makes it ca. 19% more likely to stay net short in CDS. On the one hand, this confirms hypothesis III assuming that younger managers are less likely to use CDS for risk-increasing purposes. On the other hand, the results suggest that CDS using managers who are older, have higher experience or professional skill do not shy away from applying risk-increasing strategies, which might be due to their lower sensitivity to performance-based termination. As shown by Adam and Guettler (2014), these types of strategies resulted in significant losses during the 2007-2009 financial crisis. The marginal effects reported on team management and women dummy variables are insignificantly negative. Thus, it cannot be confirmed that a team management structure or women in management significantly decrease the probability of a fund to stay net short in CDS, as presumed under hypotheses IV and V.

By contrast, funds advised by managers who obtained a degree at a top 20 U.S. university or that have managers who advise fewer (e.g. only one particular fund) as opposed to multiple funds are less likely to stay net short in CDS. These variables decrease the probability to stay net short in CDS, ceteris paribus, by ca. 13% and 27%, respectively.[28] As shown in column (5), the aforementioned results, except for managers with a PhD degree, remain constant even after accounting for the non-random, self-selection of funds into CDS use, although the size of the effects decreases by around 40%. Following the results of the likelihood ratio test presented as a Wald test, using a Heckman model is superior to estimating two independent equations. In this case, the pseudo R-squared is determined based on the Chi-square test statistics as suggested by Aldrich and Nelson (1984) (see Veall and Zimmermann (1996) for an overview). Hence, as opposed to older, more experienced or professionally successful managers, those who are younger or better educated (as measured by university prestige) shy away from staying net short in CDS, possibly due to concerns over their careers (Chevalier and Ellison (1999a, 1999b)).

In addition to these findings, if funds are part of a fund complex they are 36% more likely to stay net short in CDS. If funds are at least 10 years older than the average fund age of 20 years, they are 7% more likely to stay short in CDS.[29] Well established funds operating a derivative trading desk possibly have the experience to use net short CDS for a variety of purposes as opposed to their counterparts. By contrast, CDS use decreases by ca. 24% and 14%, respectively, for investment grade funds and for funds that use other types of derivatives in parallel. From the viewpoint of investors, one would expect investment grade funds to not to engage in risk-increasing derivative strategies, while funds already using other derivatives possibly do not see the need to use CDS.

Moreover, the coefficients typically reported for the conditional fixed effects logit model, which account for the unobservable time invariant characteristics of funds and managers, are provided in column (4) of **Table 5** and do not show any significant correlations between the previously analyzed determinants and the decision to stay net short in CDS. For the subgroup of funds that switch between staying net short and net long in CDS, this indicates that either fixed effects or a wide heterogeneity of reasons influence CDS use.

In **Table 7** the "CDS net short" dummy is replaced by the respective net CDS use (long – short notional as related to TNA) variable ("CDS net/TNA"). Columns (1)-(4) show the results of OLS

[28] Once the turnover ratio is replaced by its adjusted version, as seen in column (4) of **Table 4**; the correlation between the direction of CDS use and the presence of managers who advise fewer (e.g. only one particular fund) as opposed to multiple funds becomes insignificant, which might be associated with the time period analyzed (2006-2010).

[29] The same analysis performed considering an adjusted turnover ratio confirms the results for these variables, except for fund age, which might be associated with the period analyzed (2006-2010).

regressions, while columns (3)-(4) also include fixed effects. Again, the analysis performed in column (2) is extended by applying the Heckman correction (Heckman (1976, 1979)) based on maximum likelihood estimation for a non-random self-selection of funds into CDS use and reported in column (5). Additionally, it should be noted that the CDS net notional is positive (negative) whenever funds are net long (net short). Thus, by looking at the coefficients, one cannot distinguish whether the variables of interest are increasing net short CDS or decreasing net long CDS positions (or vice versa) during this time.

From **Table 4**, it is shown that managers educated at prestigious universities or those who advise fewer funds (e.g., only one particular fund as opposed to multiple funds) are less likely to stay net short in CDS. Thus, as indicated in column (2) of **Table 7**, the net long CDS positions of funds are more often increased (than net short CDS decreased) by economically high ca. 0.0410 and 0.0397 of TNA, respectively. **Table 7** presents, in comparison with **Table 4,** that funds are more likely to stay net short in CDS when the experience of a management team (or manager) is increased, leading to higher net short CDS positions of ca. 0.0135 per 1 year of additional experience (lower levels of net long positions occur less often). This result is in line with previous literature that suggests that longer tenured managers have a higher inclination towards risk. Nevertheless, a more in depth analysis of the asset allocations of funds might reveal a large heterogeneity in terms of applied strategies based on short CDS (as presented in section 2). There is an additional effect observable for managers who obtained a master's degree: They tend to have either smaller net long or higher net short positions in CDS (by. ca. 0.0410 of TNA). Other variables identified to affect a fund's decision to stay net short in CDS (PhD title, manager age) do not affect the extent of net CDS use. If considering the Heckman correction for self-selection of funds into CDS use, the aforementioned results remain stable and comparable in size (**Table 7**, column (5)); the results from the selection equation are similar to those reported in column (3) of **Table 3**. Additionally, the occurrence of a woman in management, which was identified to decrease the extent of CDS, leads either to higher net long or lower net short positions in CDS (by ca. 0.0629 of TNA). As suggested by the likelihood ratio test presented as a Wald test (reported at the bottom of **Table 7**), the Heckman method is more preferable than estimating two independent equations and together with the inverse of the Mills' ratio from the selection equation controlling for self-selection is recommendable.

Furthermore, funds belonging to a bigger complex that are more likely to stay net short in CDS also keep higher net short (and less often lower net long) CDS positions (by ca. 0.0551 of TNA). On the contrary, investment grade funds are less likely to stay net short in CDS; thus, their net long CDS positions are higher (and less often net short CDS positions lower) by ca. 0.0662 of TNA. In addition, a

higher turnover ratio of funds, which does not affect a fund's decision to use or stay net short in CDS, either increases net short or decreases net long positions in CDS (by ca. 0.0098 of TNA per 10% higher turnover ratio). This suggests that funds which are more active in trading tend to use slightly more short CDS because of the higher expected transaction cost efficiency, which might manifest, e.g., when funds substitute direct investments into securities indirectly via CDS (e.g., Stulz (2010)).

The results of the fixed effects regression are reported in column (4) of **Table 7** and support previous findings regarding managers who hold a master's degree, have higher experience or those who advise only one particular fund as opposed to multiple funds. During the period considered, funds with above period average of more experienced managers or managers with master's degree decrease net long and increase net short CDS positions, while managers that advise fewer funds affect these CDS positions in the opposite direction. In addition, incorporating managers with a PhD title, who are more likely to stay net short in CDS, increases the respective positions in CDS considerably. By contrast, the presence of women in management leads to either an increase in net long or a decrease in net short positions in CDS. On the fund level, both an increase in fund age and an increase in the turnover ratio decrease net long or increase net short CDS positions.

Overall, certain manager characteristics affect a fund's decision to stay net short in CDS and the extent of net CDS use. For example, funds with more experienced managers, who are more likely to stay net short in CDS, tend to have higher CDS net short positions in relation to a fund's net assets, on average. By contrast, the opposite behavior is observable with regard to staying net short in CDS and extending net short CDS use for managers who obtained a degree from a prestigious university or advise one instead of multiple funds. Further research should focus more on the interaction between manager characteristics and the investment strategies implemented by funds.

6 Conclusion

This study focuses on an extended set of potential determinants of the choice of U.S. corporate bond funds to use CDS between 2004 and 2010. Of particular interest is the extent of total and net CDS use, including long and short CDS written on single- and multi-name references. I find that fund age, the fraction of institutional investors, and parallel investments into other derivatives positively correlate with the decision of funds to use CDS. Furthermore, the probability to use CDS is, ceteris paribus, positively affected by having a single manager instead of a team in place as well as the presence of a manager with a master's degree or who obtained a degree from a top 20 U.S. university. Thus, managers with a better quality of education/network and know how to use derivatives are more likely to use these complex instruments as part of portfolio management.

However, none of the manager characteristics that are identified to increase the probability to use CDS influence the size of the CDS holdings. Instead, it is observable that the presence of women in management negatively affects the size of CDS holdings, while the presence of more experienced managers has the opposite effect. In addition to these findings, the extent of CDS use is significantly positively affected by a higher fraction of institutional holdings, higher fund outflows and parallel use of other derivatives. Thus, managers who tend to use CDS often do not necessarily keep highest/lowest positions in CDS, which is supportive for a wide heterogeneity in terms of size of CDS positions across the funds and time. In particular, during the height of the crisis in 2008, a significant increase in short CDS written on multi-name underlying positions and long CDS written on single-name references is observable.

As opposed to managers who obtained a degree from a prestigious university, successful managers having higher assets under their management and more experienced managers are more likely to stay net short in CDS. This suggests that young or better educated and networked managers behave differently than more experienced managers, possibly because of diverging career concerns (e.g., due to the risk of termination). It is also shown that more experienced managers tend to have higher risk-increasing CDS net short positions in relation to a fund's net assets on average, while mangers who obtained a degree from a prestigious university or advise one instead of multiple funds behave in the opposite way. However, it remains unknown whether or not short CDS are mainly used by funds to replicate securities or to create additional leverage in order to boost returns. Further research should focus on analyzing changes in the asset allocations of funds based on portfolio holdings data to better understand the investment strategies implemented by funds.

Knowledge about the interaction of specific manager characteristics and funds investment strategies is important for the public and regulators since, in the interest of investor protection, strategies that have a high potential for loss could be better limited by fund boards via internal restrictions.

Appendix A

This appendix lists the variables I used in the empirical study and explains their construction. The sample period starts in the 3rd quarter of 2004 and ends in the 4th quarter of 2010.

Credit Default Swaps (CDS) using funds: corporate bond funds that used CDS at least once during the time between 2004 and 2010.

CDS Dummy: a dummy variable indicating whether or not a corporate bond fund used CDS in a particular quarter between 2004 and 2010.

CDS net short: a dummy variable indicating whether or not a corporate bond fund stayed net short in CDS in a particular quarter between 2004 and 2010 (conditional on CDS use).

CDS notional: The notional position is determined based on aggregated (quarterly) long plus short CDS positions.

CDS net notional: The net notional position is determined based on aggregated (quarterly) long minus short CDS positions and includes, but is not limited to, offsetting positions. The CDS net notional is positive (negative) whenever funds are net long (net short).

CDS/TNA: notional amount of all CDS used by a fund in a particular quarter between 2004 and 2010 expressed as a fraction of a fund's TNA.

CDS net/TNA: net notional amount of all CDS (long – short positions) used by a fund in a particular quarter between 2004 and 2010 expressed as a fraction of a fund's TNA.

Long CDS: quarterly notional amount of all CDS as a fraction of a fund's TNA where a fund bought protection (based on items from periodic reports).

Short CDS: quarterly notional amount of all CDS as a fraction of a fund's TNA where a fund sold protection (based on items from periodic reports).

Long single-name CDS: quarterly notional amount of CDS as a fraction of a fund's TNA where a fund bought protection on a single-name underlying position, e.g., corporate bond or sovereign bond (based on items from periodic reports).

Long multi-name CDS: quarterly notional amount of CDS as a fraction of a fund's TNA where a fund bought protection on a multi-name underlying position, e.g., basket of bonds, asset-backed securities, CDS or bond indices (based on items from periodic reports).

Short single-name CDS: quarterly notional amount of CDS as a fraction of a fund's TNA where a fund sold protection on a single-name underlying position, e.g., corporate bond or sovereign bond (based on items from periodic reports).

Short multi-name CDS: quarterly notional amount of CDS as a fraction of a fund's TNA where a fund sold protection on a multi-name underlying position, e.g., basket of bonds, asset-backed securities, CDS or bond indices (based on items from periodic reports).

Long CDS offset: quarterly notional amount of long CDS offset by prevalent notional amount of short CDS positions as a fraction of a fund's TNA. In this situation, a fund bought protection on an underlying position of a particular issuer that offsets an existing (short) CDS position where a fund sold protection on an underlying position of a particular issuer. Issuers of CDS references from periodic reports are used to find offsetting CDS positions.

Long CDS non-offset: quarterly notional amount of long CDS not offset by prevalent notional amount of short CDS positions as a fraction of a fund's TNA. In this situation, a fund bought protection on an underlying position for other reasons than to offset existing (short) CDS positions. Issuers of CDS references from periodic reports are used to find offsetting CDS positions.

Short CDS offset: quarterly notional amount of short CDS offset by prevalent notional amount of long CDS positions as a fraction of a fund's TNA. In this situation, a fund sold protection on an underlying position of a particular issuer that offsets an existing (long) CDS position where a fund bought protection on an underlying position of a particular issuer. Issuers of CDS references from periodic reports are used to find offsetting CDS positions.

Short CDS non-offset: quarterly notional amount of short CDS not offset by prevalent notional amount of long CDS positions as a fraction of a fund's TNA. In this situation, a fund sold protection on an underlying position for other reasons than to offset existing (long) CDS positions. Issuers of CDS references from periodic reports are used to find offsetting CDS positions.

Fund TNA: total net asset value as provided by CRSP (summed up for all share classes of a fund) that is equal to total assets minus total liabilities in mio. of $ reflecting fund size.

Fund TNA (ln): fund size expressed as a natural logarithm of total net asset value.

Fund age: fund age expressed as the number of years an oldest share class of a fund is existing based on a fund's inception date as provided by CRSP.

Fund age (ln): fund age expressed as the natural logarithm of the number of years an oldest share class of a fund is existing based on a fund's inception date as provided by CRSP.

Turnover ratio: fund turnover ratio relating the minimum of aggregated sales or aggregated purchases of securities to the average 12-month total net assets of the fund as provided by CRSP.

Adj. turnover ratio: adjusted fund turnover ratio is the residual from the regression of turnover ratio on the average duration of funds (from Morningstar), which is available for the period 2006 to 2010.

Expense ratio: ratio of total investment that shareholders pay for the fund's operating expenses, which include 12b-1 fees (which may also include waivers and reimbursements) as of the most recently completed fiscal year (provided by CRSP in % of a fund's TNA).

Investment grade: dummy variable indicating whether a bond fund is primarily invested in securities rated investment-grade (IG) or a high-yield (HY) based on Lipper classes provided by CRSP. E.g., the IG category contains the following Lipper classes: Corporate Debt Funds A-rated, Corporate Debt Funds BBB-rated, Short Investment Grade Debt Funds, Short-Intermediate Investment Grade Debt Funds, Intermediate Investment Grade Debt Funds, while the HY category contains Multi-Sector Income Funds and High Current Yield Funds.

Institutional investments (fraction of TNA): variable indicating the fraction of TNA held by institutional investors determined based on CRSP's classification of fund share classes as institutional.

Other derivatives: dummy variable indicating whether a fund uses derivatives other than CDS as reported in N-SAR Forms.

Single manager: dummy variable indicating whether a fund is managed by a single manager or a team in a particular quarter as stated in Morningstar.

Team: dummy variable indicating whether a bond fund is managed by a team or a single manager in a particular quarter as stated in Morningstar.

Female manager / female manager (dummy): variable indicating the fraction of women in a management team (including a single female manager) managing a fund in a particular quarter as stated in Morningstar. However, for regression analysis, a female manager dummy is created that indicates whether at least one woman occurs in a particular period as a fund manager.

Top20 U.S. university (dummy) / top20 university team-adjusted (dummy): dummy variable indicating whether a manager obtained an educational degree at a university that belongs to the top 20 U.S. universities (determined according to Business Week Rankings in 2008 and 2010, and university information provided by Morningstar). However, in regression analysis for teams, a dummy is created showing whether the majority of team members have obtained a degree from a top 20 U.S. university.

Manager degree (dummy) / master degree team-adjusted (dummy): dummy variable indicating the highest university degree obtained by a manager (in case of a management team, it is determined as the mean) as provided by Morningstar. However, in regression analysis for teams, a dummy is created showing whether the majority of team members has obtained a master's (in addition to having a bachelor's) degree.

PhD degree (dummy) / PhD team-adjusted (dummy): dummy variable indicating the highest university degree obtained by a manager (in case of a management team, it is determined as the mean) as provided by Morningstar. However, in regression analysis for teams, a dummy is created showing whether or not at least one person has obtained this degree.

Manager age: manager age expressed by the number of years as determined based on Morningstar data for education year and highest degree reached (as suggested by Chevalier and Ellison (1999a), e.g. bachelor + 21 years).

Manager experience: manager experience expressed by the number of years a manager (in the case of a management team, it is determined as the mean) spend on managing one of the largest 100 corporate bond funds between mid-2004 and 2010.

Assets under management (AUM): assets under the management of a single manager (in mio. of $) determined as the sum of the 100 largest corporate bond funds' net assets advised by this manager in a particular reporting period as provided by Morningstar and based on CRSP data (as suggested by Wu, Wermers, and Zechner (2013)). Similarly, the AUM of a management team is determined as the mean of AUM managed by all team members in a particular reporting period.

Assets under management (ln): natural logarithm of assets under management of a single manager determined for the 100 largest corporate bond funds' net assets advised by this manager in a particular reporting period as provided by Morningstar and based on CRSP data. Similarly, ln AUM of a management team is determined as the natural logarithm of the mean AUM managed by all team members in a particular reporting period.

TNA/AUM: variable indicating the relation of a particular fund's TNA to the assets under the control of an individual manager (or team of managers) in a quarter.

Past flows: past quarter's net fund flows determined based on total monthly fund in- and outflows from CRSP ((TNA_t – TNA_t-1(1 + monthly fund return_t))/TNA_t-1, e.g. Sirri and Tufano (1988)).

Return: three months fund return calculated from total monthly returns as provided by CRSP.

Standard deviation: standard deviation of daily fund returns for a fund's largest share class over the last three months.

1F-alpha: outcome of the regression of the daily excess return on a constant and the daily excess returns of the Barclays Capital U.S. Aggregate Bond Index over 3 and 6, months (Adam and Guettler (2014)).

4F-alpha: outcome of the regression of the daily excess return on a constant, the daily excess returns of the Barclays Capital U.S. Aggregate Bond Index extended by three additional risk factors: the stock market index (CRSP value-weighted returns, all stocks listed at NYSE/AMEX/NASDAQ), the yield spread between the Barclay's Capital U.S. Mortgage-Backed Securities Index and the risk-free rate, and the spread between the Barclays Capital U.S. Corporate High-Yield index and the Barclays Capital U.S. Intermediate Government/Credit index over 3 and 6 months (Adam and Guettler (2014)).

Appendix B: Industries of issuers being referenced via single-name CDS (as measured by no. of contracts and notional amount in relation to a fund's TNA per CDS reference issuer)

Variable	All industries		Non-Durables		Durables		Manufacturing		Energy		Chemicals		B. Equipment	
All CDS user	N	mean	N	mean	N	mean	N	mean	N	mean	N	mean	N	mean
CDS net notional / TNA	15475	-0.00056	597	0.00015	498	-0.00302	729	0.00018	585	-0.00038	202	0.00023	654	-0.00038
Long CDS notional / TNA	15475	0.00093	597	0.00126	498	0.00106	729	0.00130	585	0.00082	202	0.00102	654	0.00095
Offsetting long CDS notional / TNA (= short CDS)	15471	0.00005	597	0.00006	498	0.00061	729	0.00004	585	0.00001	202	0.00000	654	0.00003
Non-offsetting long CDS notional / TNA	15471	0.00088	597	0.00119	498	0.00045	729	0.00126	585	0.00082	202	0.00101	654	0.00093
Short CDS notional / TNA	15475	-0.00149	597	-0.00111	498	-0.00407	729	-0.00112	585	-0.00120	202	-0.00078	654	-0.00133
Non-offsetting short CDS notional / TNA	15471	-0.00144	597	-0.00104	498	-0.00347	729	-0.00108	585	-0.00119	202	-0.00078	654	-0.00131
CDS using funds staying net short														
CDS net notional / TNA	12146	-0.00144	437	-0.00077	413	-0.00361	545	-0.00095	517	-0.00102	133	-0.00056	494	-0.00143
Long CDS notional / TNA	12146	0.00031	437	0.00066	413	0.00087	545	0.00046	517	0.00026	133	0.00058	494	0.00031
Offsetting long CDS notional / TNA (= short CDS)	12143	0.00005	437	0.00009	413	0.00056	545	0.00004	517	0.00001	133	0.00001	494	0.00002
Non-offsetting long CDS notional / TNA	12143	0.00027	437	0.00058	413	0.00030	545	0.00042	517	0.00025	133	0.00057	494	0.00029
Short CDS notional / TNA	12146	-0.00176	437	-0.00143	413	-0.00447	545	-0.00141	517	-0.00128	133	-0.00114	494	-0.00173
Non-offsetting short CDS notional / TNA	12143	-0.00171	437	-0.00134	413	-0.00391	545	-0.00136	517	-0.00127	133	-0.00113	494	-0.00171
CDS using funds staying net long														
CDS net notional / TNA	3329	0.00266	160	0.00264	85	-0.00014	184	0.00350	68	0.00454	69	0.00177	160	0.00284
Long CDS notional / TNA	3329	0.00318	160	0.00288	85	0.00200	184	0.00377	68	0.00512	69	0.00186	160	0.00293
Offsetting long CDS notional / TNA (= short CDS)	3328	0.00007	160	0.00001	85	0.00083	184	0.00002	68	0.00000	69	0.00000	160	0.00003
Non-offsetting long CDS notional / TNA	3328	0.00311	160	0.00287	85	0.00117	184	0.00375	68	0.00512	69	0.00186	160	0.00290
Short CDS notional / TNA	3329	-0.00053	160	-0.00023	85	-0.00213	184	-0.00028	68	-0.00059	69	-0.00009	160	-0.00009
Non-offsetting short CDS notional / TNA	3328	-0.00045	160	-0.00023	85	-0.00131	184	-0.00025	68	-0.00058	69	-0.00009	160	-0.00006

Appendix B: Industries of issuers being referenced via single-name CDS (as measured by no. of contracts and notional amount in relation to a fund's TNA per CDS reference issuer) – continued from previous page

Variable	Telecomm.		Utilities		Stores		Health		Finance		Others		Sovereigns	
All CDS user	N	mean	N	mean	N	mean	N	mean	N	mean	N	mean	N	mean
CDS net notional / TNA	672	-0.00078	686	-0.00165	1157	0.00143	317	-0.00034	4593	-0.00103	3574	0.00016	1211	-0.00222
Long CDS notional / TNA	672	0.00083	686	0.00027	1157	0.00178	317	0.00080	4593	0.00104	3574	0.00066	1211	0.00054
Offsetting long CDS notional / TNA (= short CDS)	672	0.00006	686	0.00002	1157	0.00001	317	0.00003	4593	0.00003	3570	0.00002	1211	0.00009
Non-offsetting long CDS notional / TNA	672	0.00077	686	0.00026	1157	0.00177	317	0.00077	4593	0.00101	3570	0.00064	1211	0.00045
Short CDS notional / TNA	672	-0.00161	686	-0.00193	1157	-0.00035	317	-0.00114	4593	-0.00208	3574	-0.00049	1211	-0.00276
Non-offsetting short CDS notional / TNA	672	-0.00155	686	-0.00191	1157	-0.00034	317	-0.00110	4593	-0.00204	3570	-0.00047	1211	-0.00267
CDS using funds staying net short														
CDS net notional / TNA	549	-0.00126	595	-0.00198	751	0.00033	222	-0.00109	3796	-0.00216	2681	-0.00039	1013	-0.00275
Long CDS notional / TNA	549	0.00056	595	0.00010	751	0.00083	222	0.00025	3796	0.00018	2681	0.00019	1013	0.00027
Offsetting long CDS notional / TNA (= short CDS)	549	0.00007	595	0.00000	751	0.00001	222	0.00004	3796	0.00003	2678	0.00002	1013	0.00004
Non-offsetting long CDS notional / TNA	549	0.00049	595	0.00010	751	0.00082	222	0.00021	3796	0.00015	2678	0.00018	1013	0.00023
Short CDS notional / TNA	549	-0.00182	595	-0.00208	751	-0.00050	222	-0.00134	3796	-0.00234	2681	-0.00059	1013	-0.00302
Non-offsetting short CDS notional / TNA	549	-0.00175	595	-0.00208	751	-0.00049	222	-0.00130	3796	-0.00231	2678	-0.00057	1013	-0.00298
CDS using funds staying net long														
CDS net notional / TNA	123	0.00136	91	0.00049	406	0.00345	95	0.00142	797	0.00431	893	0.00183	198	0.00045
Long CDS notional / TNA	123	0.00206	91	0.00144	406	0.00353	95	0.00208	797	0.00515	893	0.00205	198	0.00190
Offsetting long CDS notional / TNA (= short CDS)	123	0.00005	91	0.00014	406	0.00000	95	0.00001	797	0.00007	892	0.00003	198	0.00032
Non-offsetting long CDS notional / TNA	123	0.00201	91	0.00129	406	0.00353	95	0.00207	797	0.00508	892	0.00201	198	0.00158
Short CDS notional / TNA	123	-0.00071	91	-0.00095	406	-0.00007	95	-0.00066	797	-0.00084	893	-0.00022	198	-0.00144
Non-offsetting short CDS notional / TNA	123	-0.00066	91	-0.00081	406	-0.00007	95	-0.00065	797	-0.00078	892	-0.00018	198	-0.00113

Figure 1: The development of the number of U.S. funds reporting CDS between 2004 and 2010

This figure shows the fraction of U.S. corporate bond funds reporting CDS at period end between 2004 and 2010. Overall, 69 out of 100 funds use CDS at some point in time between 2004 and 2010.

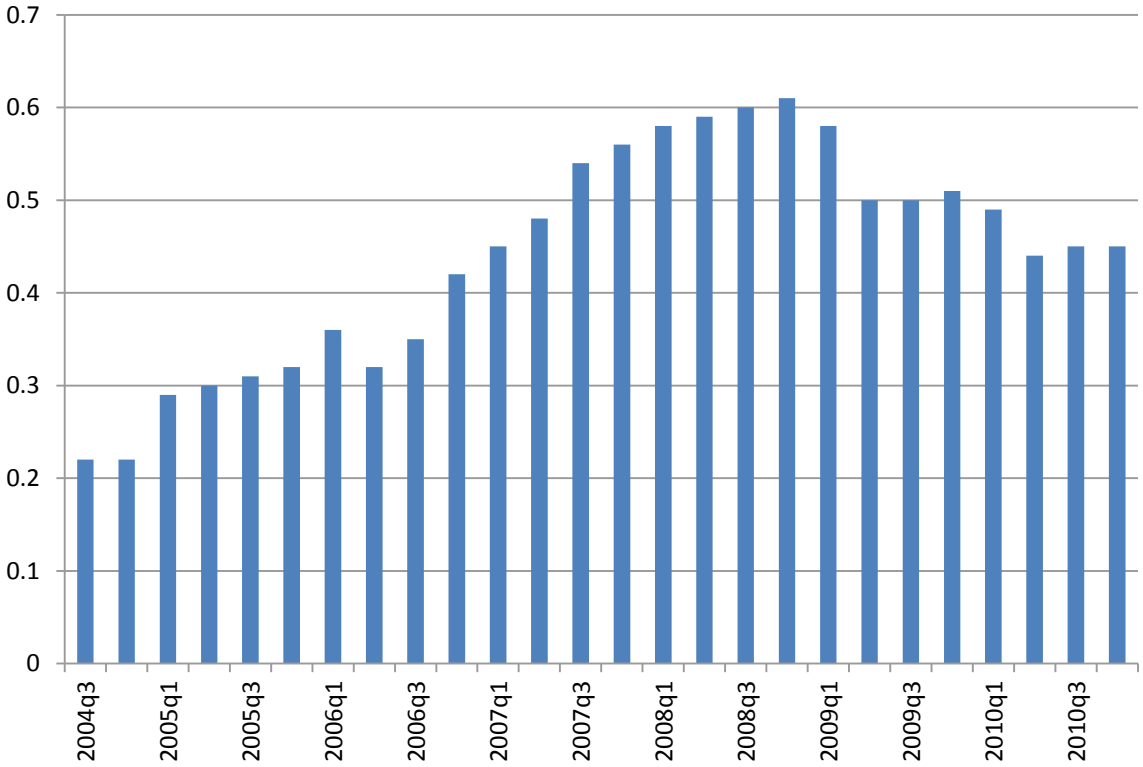

Figure 2: The development of long and short CDS positions of U.S. funds between 2004 and 2010

This figure shows the development of funds' average CDS long and short positions together with the net notional amount (long – short positions) conditional on CDS use in a particular period, and the level of the general credit risk premium represented by BBB yield – Treasury yield between 2004 and 2010. CDS notional amounts are normalized by a fund's total net asset value (TNA).

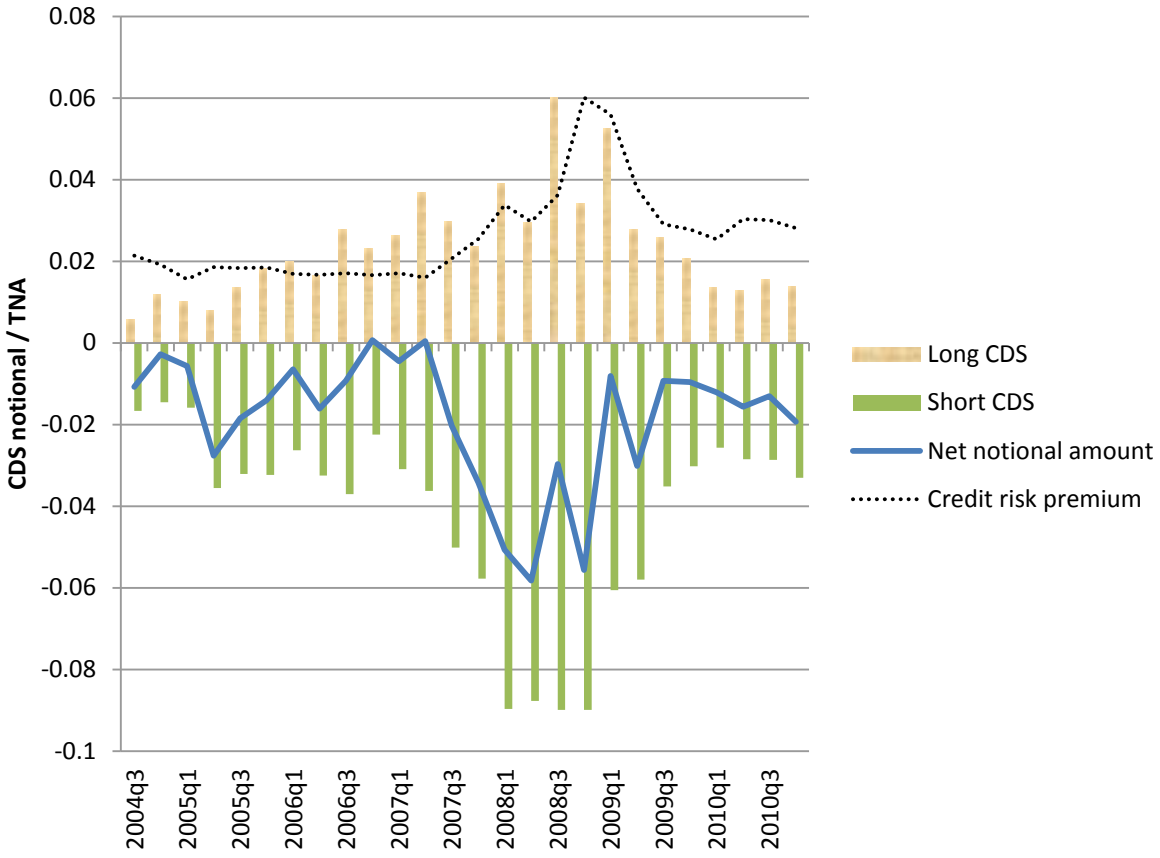

Figure 3: The development of long and short CDS positions written on single-name references of U.S. funds between 2004 and 2010

This figure shows the development of funds' average CDS long and short positions written on single-name references conditional on CDS use in a particular period between 2004 and 2010. The corresponding median figures are represented by the dotted lines. CDS notional amounts are normalized by a fund's total net asset value (TNA).

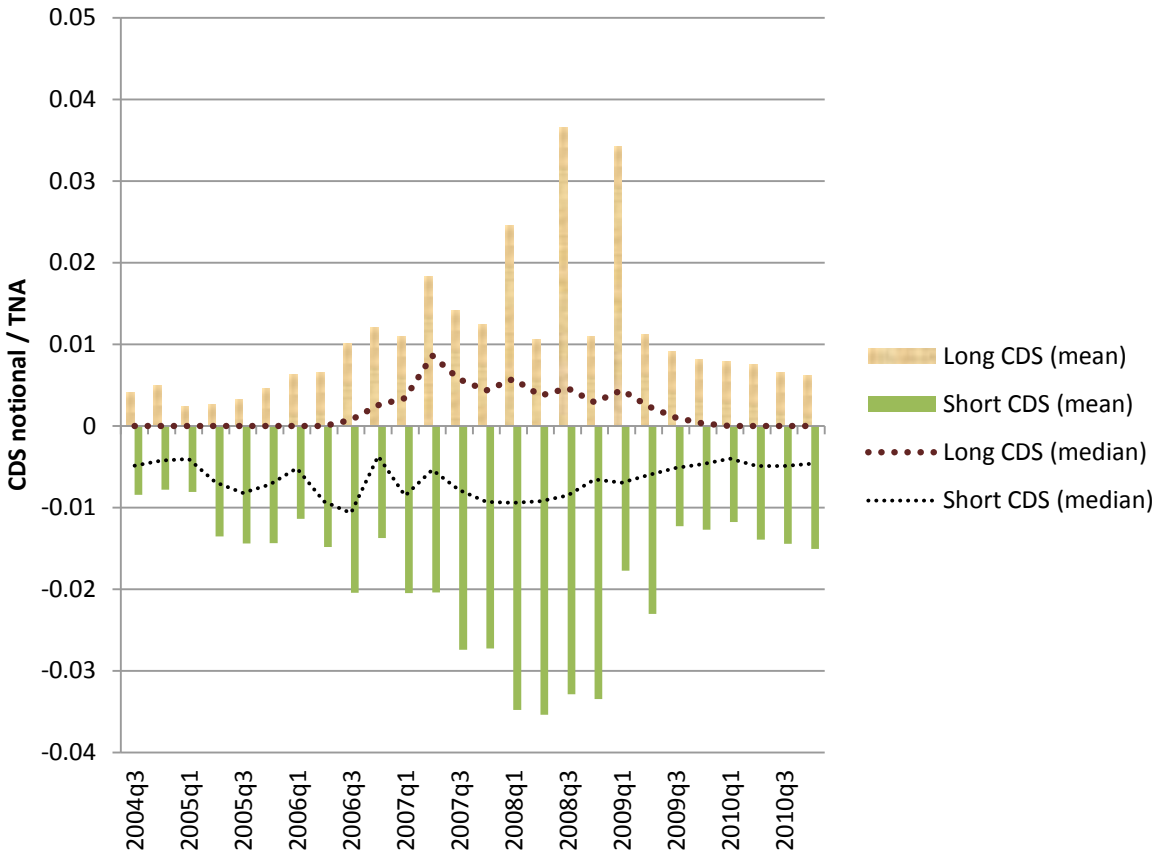

Figure 4: The development of long and short CDS positions written on multi-name references of U.S. funds between 2004 and 2010

This figure shows the development of funds' average CDS long and short positions written on multi-name references conditional on CDS use in a particular period between 2004 and 2010. The corresponding median figures are represented by the dotted lines. CDS notional amounts are normalized by a fund's total net asset value (TNA).

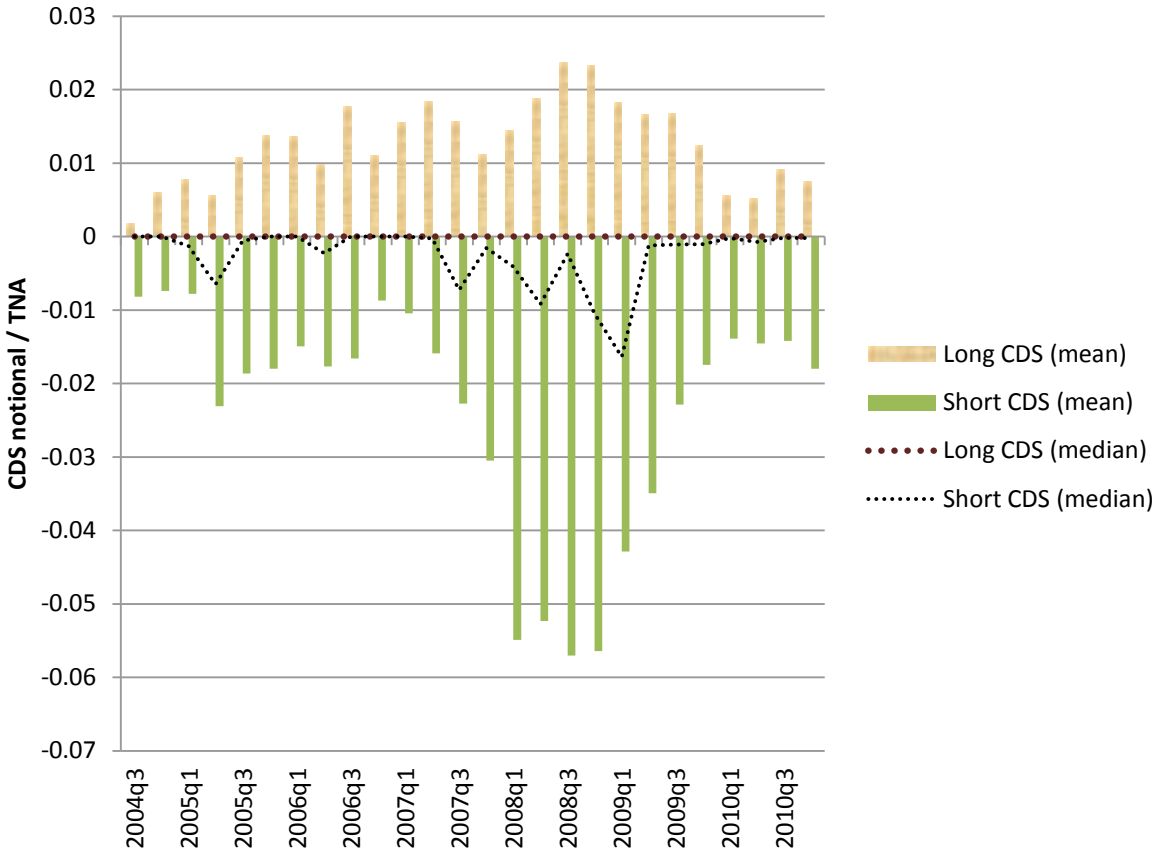

Table 1: CDS use in general (as measured by notional amount in relation to a fund's TNA)

This table shows the funds' average total CDS, net CDS (long - short positions), CDS long and short positions written on single- and multi-name references together with the parts non-offset by the respective short and long CDS written on the same issuer references in a particular period between 2004 and 2010 for all CDS using funds, CDS using funds staying net short or net long in CDS in a particular period, respectively. CDS notional amounts are normalized by a fund's total net asset value (TNA). The last row shows the unrealized appreciation/depreciation from CDS at reporting date expressed by CDS fair values in relation to a fund's TNA. For the definitions of all variables please refer to Appendix A.

Variable	N	mean	sd	min	p50	max	N	mean	sd	min	p50	max	N	mean	sd	min	p50	max
	All CDS using funds						CDS using funds staying net short						CDS using funds staying net long					
CDS notional / TNA	1768	0.0476	0.1210	0.0000	0.0090	1.2896	791	0.0736	0.1454	0.0001	0.0271	1.2731	356	0.0728	0.1403	0.0009	0.0310	1.2896
CDS net notional / TNA	1768	-0.0135	0.0843	-0.9270	0.0000	1.1035	791	-0.0480	0.0929	-0.9270	-0.0193	-0.0001	356	0.0397	0.1020	0.0000	0.0137	1.1035
Long CDS	1768	0.0170	0.0616	0.0000	0.0000	1.1965	791	0.0128	0.0397	0.0000	0.0000	0.4288	356	0.0560	0.1153	0.0000	0.0244	1.1965
Long single-name CDS	1768	0.0081	0.0486	0.0000	0.0000	1.1965	791	0.0048	0.0105	0.0000	0.0000	0.0843	356	0.0298	0.1044	0.0000	0.0089	1.1965
Long multi-name CDS	1768	0.0089	0.0347	0.0000	0.0000	0.4128	791	0.0080	0.0338	0.0000	0.0000	0.4128	356	0.0262	0.0548	0.0000	0.0000	0.4118
Long multi-name CDS (ABS)	1768	0.0011	0.0068	0.0000	0.0000	0.1577	791	0.0010	0.0054	0.0000	0.0000	0.0840	356	0.0031	0.0125	0.0000	0.0000	0.1577
Long CDS offsetting	1768	0.0029	0.0144	0.0000	0.0000	0.2951	791	0.0043	0.0171	0.0000	0.0000	0.2951	356	0.0051	0.0189	0.0000	0.0000	0.1574
Long CDS non-offsetting	1768	0.0141	0.0561	0.0000	0.0000	1.1965	791	0.0085	0.0279	0.0000	0.0000	0.3417	356	0.0509	0.1101	0.0000	0.0240	1.1965
Short CDS	1768	0.0305	0.0842	0.0000	0.0026	0.9706	791	0.0608	0.1154	0.0001	0.0232	0.9706	356	0.0163	0.0420	0.0000	0.0023	0.4072
Short single-name CDS	1768	0.0130	0.0444	0.0000	0.0000	0.8022	791	0.0269	0.0633	0.0000	0.0118	0.8022	356	0.0049	0.0100	0.0000	0.0000	0.0673
Short multi-name CDS	1768	0.0174	0.0605	0.0000	0.0000	0.7974	791	0.0338	0.0835	0.0000	0.0062	0.7974	356	0.0114	0.0391	0.0000	0.0000	0.3989
Short multi-name CDS (ABS)	1768	0.0034	0.0202	0.0000	0.0000	0.3914	791	0.0060	0.0280	0.0000	0.0000	0.3914	356	0.0036	0.0162	0.0000	0.0000	0.1927
Short CDS offsetting	1768	0.0029	0.0144	0.0000	0.0000	0.2951	791	0.0043	0.0171	0.0000	0.0000	0.2951	356	0.0051	0.0189	0.0000	0.0000	0.1574
Short CDS non-offsetting	1768	0.0275	0.0762	0.0000	0.0023	0.9433	791	0.0565	0.1054	0.0001	0.0226	0.9433	356	0.0112	0.0273	0.0000	0.0018	0.2498
All CDS (fair value/a fund's TNA)	1768	-0.0019	0.0173	-0.5230	0.0000	0.1507	791	-0.0032	0.0176	-0.3240	-0.0001	0.1507	356	-0.0026	0.0279	-0.5230	-0.0001	0.0121

Table 2: Summary statistics

This table shows the summary statistics for all variables referred to in the study, which are described in detail in Appendix A. The last two columns show the p-values of the T-test and Wilcoxon rank-sum (WRS) test, respectively. T-test performs a t-test on the equality of means within two groups, while the WRS-test tests the hypothesis that two independent samples are from populations with the same distribution.

	All funds				Funds non-using CDS				Funds using CDS					
	N	mean	sd	p50	N	mean	sd	p50	N	mean	sd	p50	T-test	WRS-test
Fund TNA (in $ mio.)	2557	5,842	15,716	2,314	789	7,247	10,997	3,634	1,768	5,214	17,381	1,864	0.0004	0.0000
Fund TNA (ln TNA)	2557	7.8954	1.0614	7.7466	789	8.2847	1.0338	8.1981	1768	7.7217	1.0271	7.5303	0.0000	0.0000
Fund age (years)	2557	21.8694	10.4047	20.0000	789	20.6464	9.3151	19.0000	1768	22.4152	10.8137	20.0000	0.0000	0.0007
Fund age (ln)	2557	2.9798	0.4644	2.9957	789	2.9183	0.4836	2.9444	1768	3.0072	0.4531	2.9957	0.0000	0.0007
Institutional investments (fraction of TNA)	2557	0.3338	0.3875	0.1251	789	0.1962	0.2870	0.0566	1768	0.3952	0.4101	0.1967	0.0000	0.0000
Expense ratio (in %)	2557	0.7788	0.3427	0.7411	789	0.7658	0.3907	0.7800	1768	0.7846	0.3189	0.6929	0.2358	0.5628
Turnover ratio	2557	1.4238	1.5867	0.8200	789	0.9317	1.4309	0.5100	1768	1.6434	1.6039	1.0600	0.0000	0.0000
Adjusted turnover ratio	1794	0.0000	1.6693	-0.6225	476	-0.4888	1.5817	-0.9411	1318	0.1765	1.6656	-0.4211	0.0000	0.0000
Investment grade (dummy)	2557	0.6117	0.4875	1.0000	789	0.4613	0.4988	0.0000	1768	0.6787	0.4671	1.0000	0.0000	0.0000
Big fund family (dummy)	2557	0.7458	0.4355	1.0000	789	0.6046	0.4893	1.0000	1768	0.8088	0.3933	1.0000	0.0000	0.0000
Single manager	2549	0.3672	0.4821	0.0000	789	0.3878	0.4876	0.0000	1760	0.3580	0.4795	0.0000	0.1508	0.1481
Female manager	2533	0.0642	0.1694	0.0000	773	0.1083	0.2407	0.0000	1760	0.0449	0.1211	0.0000	0.0000	0.0000
Female manager (dummy)	2549	0.1844	0.3879	0.0000	789	0.2636	0.4409	0.0000	1760	0.1489	0.3561	0.0000	0.0000	0.0000
No. of managers	2549	2.8745	2.2239	2.0000	789	2.6046	2.0008	2.0000	1760	2.9955	2.3073	2.0000	0.0000	0.0001
Assets under management (AUM, in $ mio.)	2549	18,219	41,349	4,893	789	13,937	19,204	5,379	1,760	20,139	47,953	4,473	0.0000	0.0000
Assets under management (ln AUM)	2549	8.6835	1.3286	8.4955	789	8.8313	1.1596	8.5903	1760	8.6172	1.3929	8.4057	0.0001	0.0000
Fraction TNA to AUM	2549	0.3519	0.3260	0.2020	789	0.4125	0.3240	0.3333	1760	0.3247	0.3233	0.1939	0.0000	0.0000
Top 20 university (dummy)	2533	0.5081	0.3964	0.5000	773	0.5012	0.4005	0.5000	1760	0.5111	0.3947	0.5000	0.5633	0.5119
Master degree (dummy)	2533	0.7401	0.3425	1.0000	773	0.7541	0.3338	1.0000	1760	0.7339	0.3462	1.0000	0.1658	0.1711

	All funds				Funds non-using CDS				Funds using CDS					
	N	mean	sd	p50	N	mean	sd	p50	N	mean	sd	p50	T-test	WRS-test
PhD degree (dummy)	2533	0.0334	0.1443	0.0000	773	0.0606	0.2087	0.0000	1760	0.0214	0.1020	0.0000	0.0000	0.0000
Top 20 university team-adjusted (dummy)	2557	0.5487	0.4977	1.0000	789	0.5412	0.4986	1.0000	1768	0.5520	0.4974	1.0000	0.6113	0.6108
Master degree team-adjusted (dummy)	2557	0.7622	0.4258	1.0000	789	0.7465	0.4353	1.0000	1768	0.7692	0.4214	1.0000	0.2186	0.2127
PhD degree team-adjusted (dummy)	2557	0.0919	0.2889	0.0000	789	0.1508	0.3581	0.0000	1768	0.0656	0.2477	0.0000	0.0000	0.0000
Manager age (years)	2207	43.9554	7.6698	42.5000	683	42.6218	6.6682	42.0000	1524	44.5531	8.0087	43.0000	0.0000	0.0009
Manager of top 100 experience (years)	2549	2.5738	1.6767	2.2000	789	2.6185	1.6734	2.5000	1760	2.5537	1.6782	2.0000	0.3667	0.2902
Other derivatives (dummy)	2318	0.4814	0.4998	0.0000	736	0.1603	0.3672	0.0000	1582	0.6308	0.4827	1.0000	0.0000	0.0000
Fund Flow (quarterly)	2555	-0.0016	0.1041	-0.0054	787	0.0093	0.0792	0.0027	1768	-0.0065	0.1131	-0.0110	0.0001	0.0000
Raw return (quarterly)	2557	0.0155	0.0409	0.0138	789	0.0172	0.0442	0.0154	1768	0.0148	0.0394	0.0131	0.1906	0.0681
Standard deviation	2557	0.0028	0.0069	0.0022	789	0.0027	0.0019	0.0022	1768	0.0029	0.0082	0.0022	0.3193	0.2520
1F-alpha (3 months)	2557	0.0001	0.0013	0.0000	789	0.0001	0.0008	0.0001	1768	0.0001	0.0015	0.0000	0.2463	0.0014
4F-alpha (3 months)	2557	0.0000	0.0012	0.0000	789	0.0000	0.0003	0.0000	1768	0.0000	0.0015	0.0000	0.7425	0.1961
1F-alpha (6 months)	2557	0.0001	0.0007	0.0000	789	0.0001	0.0007	0.0001	1768	0.0001	0.0007	0.0000	0.0319	0.0014
4F-alpha (6 months)	2557	0.0000	0.0005	0.0000	789	0.0000	0.0002	0.0000	1768	0.0000	0.0006	0.0000	0.7103	0.0106

Table 3: Determinants of the Decision to Use CDS

This table reports the marginal effects of determinants of a fund's decision to use CDS in a particular period (CDS Dummy) from logit regressions. As compared to columns (1)-(2), columns (3)-(4) also contain a proxy for a fund's use of derivatives other than CDS. In columns (5)-(6), the turnover ratio is replaced by the adjusted turnover ratio. For the definitions of all variables, please refer to Appendix A. All regressions contain time fixed effects. Standard errors are clustered at the fund level. *,**,*** indicate significance at the 10, 5, and 1% level, respectively; z-scores are provided in parentheses.

	(1)	(2)	(3)	(4)	(5)	(6)
	CDS Dummy	**CDS Dummy**	**CDS Dummy**	**CDS Dummy**	**CDS Dummy**	**CDS Dummy**
Big fund family (dummy)	0.2640***	0.1740**	0.1990**	0.1030	0.2330**	0.1310
	(3.0600)	(2.0600)	(2.1900)	(1.2200)	(2.4500)	(1.3700)
Fund TNA (ln)	-0.0078		-0.0027		-0.0003	
	(-0.2200)		(-0.0900)		(-0.0100)	
Fund age (ln)	0.1940**	0.2490***	0.1860**	0.2610***	0.2160**	0.3350***
	(2.4500)	(3.0000)	(2.3600)	(3.2200)	(2.4200)	(3.5100)
Institutional investments	0.1850*	0.2800***	0.1510*	0.2720***	0.1770*	0.2950***
	(1.9300)	(3.2700)	(1.7200)	(3.2000)	(1.7800)	(2.9900)
Investment grade (dummy)	0.1540*	0.1880**	0.0458	0.0869	0.0088	0.0495
	(1.8300)	(2.3100)	(0.4800)	(0.9600)	(0.0800)	(0.4300)
Turnover ratio	0.0634*	0.0810**	0.0292	0.0431		
	(1.8300)	(2.0600)	(0.9600)	(1.0900)		
Adj. turnover ratio					0.0336	0.0527
					(0.9100)	(1.2300)
Expense ratio	0.0529	0.2680*	-0.0427	0.1470	-0.0179	0.0962
	(0.3500)	(1.7100)	(-0.2800)	(0.9900)	(-0.1000)	(0.5100)
Past fund flow	0.0579	0.1460	-0.0330	0.0063	0.0650	0.0797
	(0.5100)	(1.2500)	(-0.3200)	(0.0700)	(0.6700)	(0.8100)
Other derivatives (dummy)			0.2560***	0.2350***	0.2610***	0.2400***
			(4.4300)	(3.9700)	(3.8900)	(3.7900)
Top20 U.S. university degree (dummy)		0.1250**		0.1230**		0.0804
		(2.1800)		(2.0500)		(1.4100)
Master degree (dummy)		0.1490**		0.1370**		0.1970***
		(2.2900)		(2.2600)		(3.0200)
PhD degree (dummy)		0.0819		0.0967		0.1950*
		(0.7400)		(1.0200)		(1.9100)
Assets under management (ln AUM)		-0.0213		-0.0115		-0.0203
		(-0.6000)		(-0.3500)		(-0.5600)

	(1)	(2)	(3)	(4)	(5)	(6)
	CDS Dummy	**CDS Dummy**	**CDS Dummy**	**CDS Dummy**	**CDS Dummy**	**CDS Dummy**
TNA/AUM		-0.2050		-0.2510		-0.2890*
		(-1.2400)		(-1.6400)		(-1.6500)
Manager age		0.0067		0.0023		0.0026
		(1.4100)		(0.4900)		(0.4700)
Manager experience		-0.0185		-0.0165		-0.0141
		(-0.8200)		(-0.8300)		(-0.6100)
Team managed (dummy)		-0.1760**		-0.2050***		-0.2560***
		(-2.0900)		(-2.7100)		(-2.7400)
Female (dummy)		-0.1400		-0.1290		-0.1370
		(-1.5800)		(-1.5500)		(-1.3700)
Observations	**2455**	**2121**	**2235**	**1957**	**1620**	**1406**
Pseudo R-squared	**0.1923**	**0.2803**	**0.2364**	**0.3166**	**0.2322**	**0.3140**

Table 4: Determinants of the Decision to Stay Net Short in CDS

This table reports the marginal effects of determinants of a fund's decision to stay net short in CDS (CDS net short) or not, conditional on CDS use in a particular period, from logit regressions. Columns (1)-(2) present the results including the turnover ratio, while columns (3)-(4) include the adjusted turnover ratio. The analysis in column (2) is extended by applying the Heckman correction for sample selection (maximum-likelihood probit model) in column (5), for which the inverse of the Mills ratio and the p-value of the Wald test are also reported; the results from the selection equation are similar to those reported in column (3) of **Table 3**. For the definitions of all variables please refer to Appendix A. All regressions contain time fixed effects. Standard errors are clustered at the fund level. In column (5), the pseudo R-squared is determined based on the Chi-square test statistics as suggested by Aldrich and Nelson (1984). *,**,*** indicate significance at the 10, 5, and 1% level, respectively; z-scores are provided in parentheses.

	(1)	(2)	(3)	(4)	(5)
	CDS net short	**CDS net short**	**CDS net short**	**CDS net short**	**CDS net short**
Big fund family (dummy)	0.3250***	0.3560***	0.3220***	0.3810***	0.1510
	(4.1200)	(6.6500)	(3.8500)	(5.9700)	(1.5700)
Fund TNA (ln)	0.0207		0.0305		
	(0.6500)		(0.9600)		
Fund age (ln)	0.0644	0.1560**	-0.0119	0.0953	0.0586
	(0.6800)	(2.2300)	(-0.1000)	(1.1800)	(0.9100)
Institutional investments	0.0517	-0.0048	0.0800	-0.0391	-0.0371
	(0.4200)	(-0.0400)	(0.6200)	(-0.3200)	(-0.5300)
Investment grade (dummy)	-0.2020**	-0.2400***	-0.2570**	-0.3080***	-0.1740***
	(-2.0900)	(-2.7300)	(-2.3900)	(-3.3400)	(-2.7000)
Turnover ratio	0.0134	0.0062			-0.0029
	(0.6900)	(0.3500)			(-0.2400)
Adj. turnover ratio			0.0171	0.0155	
			(0.7600)	(0.9500)	
Expense ratio	-0.2670	-0.1730	-0.2020	-0.1610	-0.1200
	(-1.6300)	(-0.9400)	(-1.1700)	(-0.8500)	(-1.0400)
Past fund flow	0.1310	0.0976	0.0479	0.0687	0.0679
	(0.8000)	(0.9500)	(0.3600)	(0.8200)	(0.8000)
Other derivatives (dummy)	-0.0717	-0.1360**	-0.1060	-0.1670**	-0.1530***
	(-0.9200)	(-2.1800)	(-1.0700)	(-2.1600)	(-3.6000)
Top20 U.S. university degree (dummy)		-0.1260**		-0.1630***	-0.0749*
		(-2.4700)		(-3.0500)	(-1.9100)
Master degree (dummy)		0.0813		0.0979	0.0524
		(0.9700)		(1.2100)	(1.0800)

	(1)	(2)	(3)	(4)	(5)
	CDS net short	**CDS net short**	**CDS net short**	**CDS net short**	**CDS net short**
PhD degree (dummy)		0.1860*		0.2130**	0.1140
		(1.7900)		(2.1100)	(1.4300)
Assets under management (ln AUM)		0.0615**		0.0679**	0.0376**
		(2.0100)		(2.2400)	(1.9700)
TNA/AUM		-0.2660**		-0.1930	-0.1730*
		(-2.1700)		(-1.5100)	(-1.9400)
Manager age		0.0102**		0.0132**	0.0063*
		(2.0000)		(2.3100)	(1.6700)
Manager experience		0.0731***		0.0683**	0.0467**
		(2.7300)		(2.5700)	(2.2300)
Team managed (dummy)		-0.0639		0.0217	-0.0405
		(-0.7000)		(0.2300)	(-0.7500)
Female (dummy)		-0.0973		-0.1170	-0.0502
		(-1.0300)		(-1.1500)	(-0.7200)
Observations	**999**	**883**	**844**	**743**	**1957/883**
Pseudo R-squared	**0.1047**	**0.2746**	**0.1150**	**0.3080**	**0.3184**
Wald test (p-value)					**0.0000**

Table 5: Determinants of the Decision to Use CDS or Stay Net Short in CDS

This table reports the coefficients of the conditional fixed effects logit regressions for the determinants of the fund's decision to use CDS or to stay net short in CDS in a particular period for funds that switch between using or not using CDS in columns (1)-(2) and those that switch between staying net short in CDS or not in columns (3)-(4), respectively. For the definitions of all variables, please refer to Appendix A. All regressions contain time fixed effects. Under the Jackknife estimation procedure, the standard errors are clustered at the fund level. *,**,*** indicate significance at the 10, 5, and 1% level, respectively; z-scores are provided in parentheses.

	(1) CDS Dummy	(2) CDS Dummy	(3) CDS net short	(4) CDS net short
Big fund family (dummy)				
Fund TNA (ln)	0.3190		-0.4530	
	(0.3900)		(-0.5200)	
Fund age (ln)	1.8920	10.7300	13.9400*	11.5800
	(0.3700)	(1.2900)	(1.9000)	(1.5000)
Institutional investments	0.8920	2.2920	-1.0610	-3.5660
	(0.1600)	(0.4000)	(-0.2700)	(-0.4900)
Investment grade (dummy)				
Turnover ratio	0.5970	0.6180	0.2760	0.3730
	(1.3000)	(1.2000)	(1.3300)	(1.6200)
Expense ratio	-2.8080	-4.3620	-7.5830	-10.4200
	(-0.7400)	(-0.7500)	(-1.0600)	(-1.2500)
Past fund flow	0.2400	0.7620	1.3840	2.0310
	(0.2600)	(0.6200)	(1.1700)	(1.3500)
Other derivatives (dummy)	0.3250	0.3470	-0.3710	-1.3880
	(0.5200)	(0.4900)	(-0.3500)	(-1.0800)
Top20 U.S. university degree (dummy)		0.6370		-1.3440
		(0.5600)		(-0.5100)
Master degree (dummy)		1.2650		-0.9890
		(1.0900)		(-0.4400)
PhD degree (dummy)		1.4810		0.3030
		(1.0400)		(0.2400)
Assets under management (ln AUM)		-0.6170		-0.5180
		(-0.6400)		(-0.5700)

	(1)	(2)	(3)	(4)
	CDS Dummy	**CDS Dummy**	**CDS net short**	**CDS net short**
TNA/AUM		0.7540		-4.3310
		(0.2300)		(-0.8700)
Manager age		0.0272		0.2320
		(0.2300)		(0.7500)
Manager experience		-0.2680		0.8670
		(-0.6300)		(1.1700)
Team managed (dummy)		-1.0840		3.1050
		(-0.3700)		(0.6900)
Female (dummy)		-2.5720		1.1550
		(-1.3000)		(0.1200)
Observations	**1156**	**952**	**768**	**663**
Pseudo R-squared	**0.3120**	**0.3650**	**0.0990**	**0.1980**

Table 6: Determinants of the Extent of Use of Total CDS

This table reports the results of OLS regressions excluding and including fund fixed effects of various determinants on a fund's extent of CDS use as measured by CDS notional amount as related to a fund's net assets (CDS/TNA) in columns (1)-(2) and (3)-(4), respectively. The analysis in column (2) is extended by applying the Heckman correction for sample selection based on maximum-likelihood estimation in column (5), for which the inverse of the Mills' ratio and the p-value of the Wald test are also reported; the results from the selection equation are similar to those reported in column (3) of **Table 3**. For the definitions of all variables, please refer to Appendix A. All regressions contain time fixed effects. Standard errors are clustered at the fund level. *,**,*** indicate significance at the 10, 5, and 1% level, respectively; t-statistics (in column (5) z-statistics) are provided in parentheses.

	(1) CDS/TNA	(2) CDS/TNA	(3) CDS/TNA	(4) CDS/TNA	(5) CDS/TNA
Big fund family (dummy)	0.0132	0.0035			0.0030
	(1.5500)	(0.4400)			(0.1200)
Fund TNA (ln)	0.0077*		0.0003		
	(1.7500)		(0.0300)		
Fund age (ln)	0.0059	0.0097	0.0508	0.1290*	0.0084
	(0.5000)	(0.6900)	(1.3200)	(1.7700)	(0.2900)
Institutional investments	0.0416**	0.0399*	0.0117	0.0191	0.0543
	(2.2900)	(1.9100)	(0.9000)	(0.9600)	(1.3200)
Investment grade (dummy)	-0.0189	-0.0281			-0.0977**
	(-1.2100)	(-1.4600)			(-2.1200)
Turnover ratio	0.0035	0.0070	-0.0051	-0.0027	0.0117
	(0.8600)	(1.4200)	(-0.9500)	(-0.4900)	(1.2800)
Expense ratio	0.0141	-0.0027	-0.0390	-0.0741	-0.0316
	(1.0000)	(-0.1500)	(-0.4500)	(-0.7700)	(-0.6200)
Past fund flow	-0.0703**	-0.0720**	-0.0510**	-0.0702***	-0.1030***
	(-2.4300)	(-2.4400)	(-2.3000)	(-2.7300)	(-2.6300)
Other derivatives (dummy)	0.0463***	0.0469***	0.0097	0.0129	0.0730***
	(2.8200)	(2.8000)	(0.9000)	(0.9700)	(2.8400)
Top20 U.S. university degree (dummy)		0.0090		0.0163	-0.0147
		(0.4800)		(0.8100)	(-0.5300)
Master degree (dummy)		0.0215		0.0209	0.0457
		(1.3800)		(0.8300)	(1.4000)
PhD degree (dummy)		0.0350		0.0391	0.0960
		(0.9900)		(1.2200)	(1.1200)
Assets under management (ln AUM)		-0.0003		-0.0222	-0.0032
		(-0.0600)		(-1.1700)	(-0.2200)

	(1) CDS/TNA	(2) CDS/TNA	(3) CDS/TNA	(4) CDS/TNA	(5) CDS/TNA
TNA/AUM		-0.0158		-0.0355	-0.0543
		(-0.7400)		(-0.8500)	(-1.1600)
Manager age		0.0006		0.0016	-0.0008
		(0.9100)		(1.2400)	(-0.5100)
Manager experience		0.0047		0.0086*	0.0225**
		(0.7900)		(1.7400)	(2.1900)
Team managed (dummy)		0.0148		0.0086	0.0200
		(0.9300)		(0.3500)	(0.5500)
Female (dummy)		-0.0301*		-0.0189	-0.1010**
		(-1.8300)		(-1.3900)	(-2.1400)
Constant	-0.1180**	-0.1110	-0.1100	-0.1850	-0.0185
	(-2.1700)	(-1.3100)	(-0.7400)	(-0.9100)	(-0.0900)
Observations	**2235**	**1957**	**2235**	**1957**	**2119/883**
R-squared	**0.1480**	**0.1860**	**0.0980**	**0.1380**	
Adjusted R-squared	**0.1360**	**0.1680**	**0.0850**	**0.1200**	
Fund fixed effects	**No**	**No**	**Yes**	**Yes**	
Inverse Mills' ratio (standard errors)					**-0.02878 (0.0153)**
Wald test (p-value)					**0.0314**

Table 7: Determinants of the Extent of Use of Net CDS

This table reports the results of OLS regressions either excluding or including fund fixed effects of various determinants of a fund's extent of net CDS use, as measured by CDS net notional amount in relation to a fund's net assets (CDS net/TNA) for funds that used CDS in a particular period between 2004 and 2010 in columns (1)-(2) and (3)-(4), respectively. The analysis in column (2) is extended by applying the Heckman correction for sample selection based on maximum-likelihood estimation in column (5), for which the inverse of the Mills' ratio and the p-value of the Wald test are also reported; the results from the selection equation are similar to those reported in column (3) of **Table 3**. The CDS net notional is positive (negative) whenever funds are net long (net short). For the definitions of all variables, please refer to Appendix A. All regressions contain time fixed effects. Standard errors are clustered at the fund level. *,**,*** indicate significance at the 10, 5, and 1% level, respectively; t-statistics (in column (5) z-statistics) are provided in parentheses.

	(1)	(2)	(3)	(4)	(5)
	CDS net/TNA	CDS net/TNA	CDS net/TNA	CDS net/TNA	CDS net/TNA
Big fund family (dummy)	-0.0532***	-0.0551***			-0.0355*
	(-2.8100)	(-3.0200)			(-1.8000)
Fund TNA (ln)	-0.0107		-0.0115		
	(-1.5500)		(-0.58)		
Fund age (ln)	0.0244	-0.0006	-0.3230***	-0.6660***	0.0117
	(1.3900)	(-0.0300)	(-3.0800)	(-4.3600)	(0.5700)
Institutional investments	-0.0037	-0.0144	-0.0003	0.0532	-0.0033
	(-0.1600)	(-0.5700)	(-0.0100)	(1.0300)	(-0.1300)
Investment grade (dummy)	0.0492**	0.0662***			0.0742***
	(2.2500)	(2.8000)			(3.0300)
Turnover ratio	-0.0085*	-0.0098**	-0.0045	-0.0085**	-0.0081*
	(-1.7700)	(-2.0700)	(-1.0200)	(-2.3400)	(-1.7400)
Expense ratio	0.0078	0.0250	0.2040	0.3240	0.0267
	(0.3500)	(0.9600)	(1.2200)	(1.4600)	(0.9900)
Past fund flow	0.0076	0.0083	0.0157	0.0073	0.0055
	(0.2900)	(0.2800)	(0.5300)	(0.2000)	(0.1700)
Other derivatives (dummy)	-0.0071	-0.0098	-0.0154	-0.0194	0.0132
	(-0.4300)	(-0.5800)	(-0.6300)	(-0.7700)	(0.6500)
Top20 U.S. university degree (dummy)		0.0410**		0.0117	0.0403**
		(2.4000)		(0.6300)	(2.4900)
Master degree (dummy)		-0.0410*		-0.0679*	-0.0419*
		(-1.7200)		(-1.7500)	(-1.7700)
PhD degree (dummy)		-0.1260		-0.1200*	-0.1320
		(-1.5200)		(-1.9500)	(-1.5800)

	(1)	(2)	(3)	(4)	(5)
	CDS net/TNA	**CDS net/TNA**	**CDS net/TNA**	**CDS net/TNA**	**CDS net/TNA**
Assets under management (ln AUM)		-0.0086		0.0370	-0.0076
		(-1.1200)		(1.3800)	(-1.0200)
TNA/AUM		0.0397*		0.1150*	0.0444*
		(1.7500)		(1.8500)	(1.8900)
Manager age		-0.0005		0.0007	-0.0005
		(-0.5300)		(0.3000)	(-0.5200)
Manager experience		-0.0135**		-0.0269*	-0.0130**
		(-2.2100)		(-1.9300)	(-2.2200)
Team managed (dummy)		0.0118		0.0087	0.0142
		(0.4500)		(0.3300)	(0.5600)
Female (dummy)		0.0612		0.0651*	0.0629*
		(1.5700)		(1.7500)	(1.6800)
Constant	0.0487	0.1490	0.8660***	1.2640***	0.0144
	(0.6700)	(1.0600)	(2.6600)	(5.0900)	(0.1000)
Observations	**999**	**883**	**999**	**883**	**1957/883**
R-squared	**0.1120**	**0.2620**	**0.0930**	**0.2460**	
Adjusted R-squared	**0.0810**	**0.2260**	**0.0640**	**0.2110**	
Fund fixed effects	**No**	**No**	**Yes**	**Yes**	
Inverse Mills' ratio (standard errors)					**0.0442 (0.0232)**
Wald test (p-value)					**0.0294**

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Declaration

Hiermit versichere ich, dass ich die vorliegende Dissertation ohne Hilfe Dritter (mit Ausnahme der in der Danksagung erwähnten Personen) angefertigt habe. Außer der angeführten Literatur habe ich keine weiteren Hilfsmittel verwendet. Zitate aus der Literatur und entlehnte Gedanken sind als solche mit genauer Quellenangabe kenntlich gemacht. Ich bezeuge durch meine Unterschrift, dass meine Angaben über die bei der Abfassung meiner Dissertation benutzten Hilfsmittel, über die mir zuteil gewordene Hilfe sowie über frühere Begutachtungen meiner Dissertation in jeder Hinsicht der Wahrheit entsprechen.

Berlin, 21. August 2014

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